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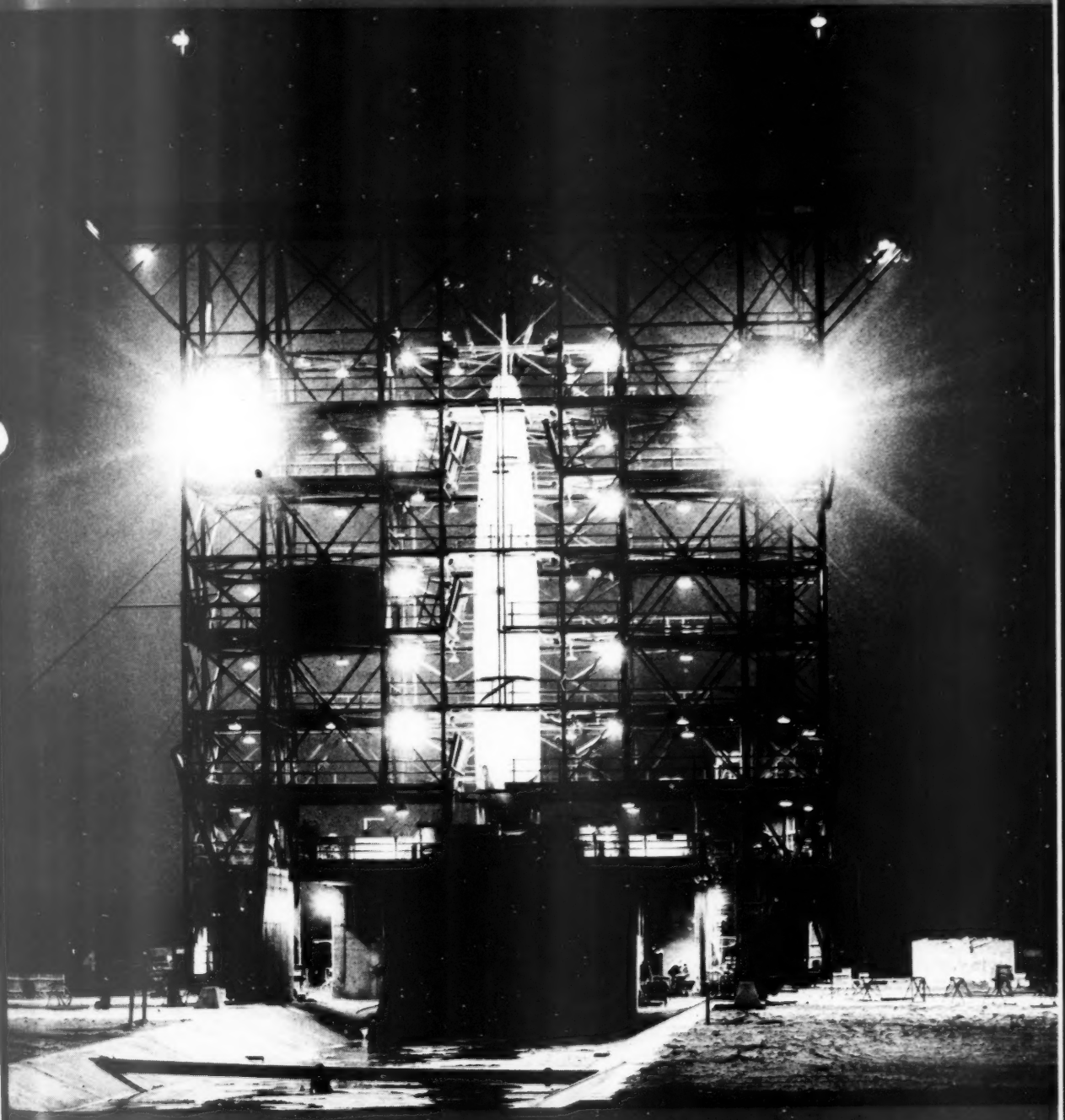
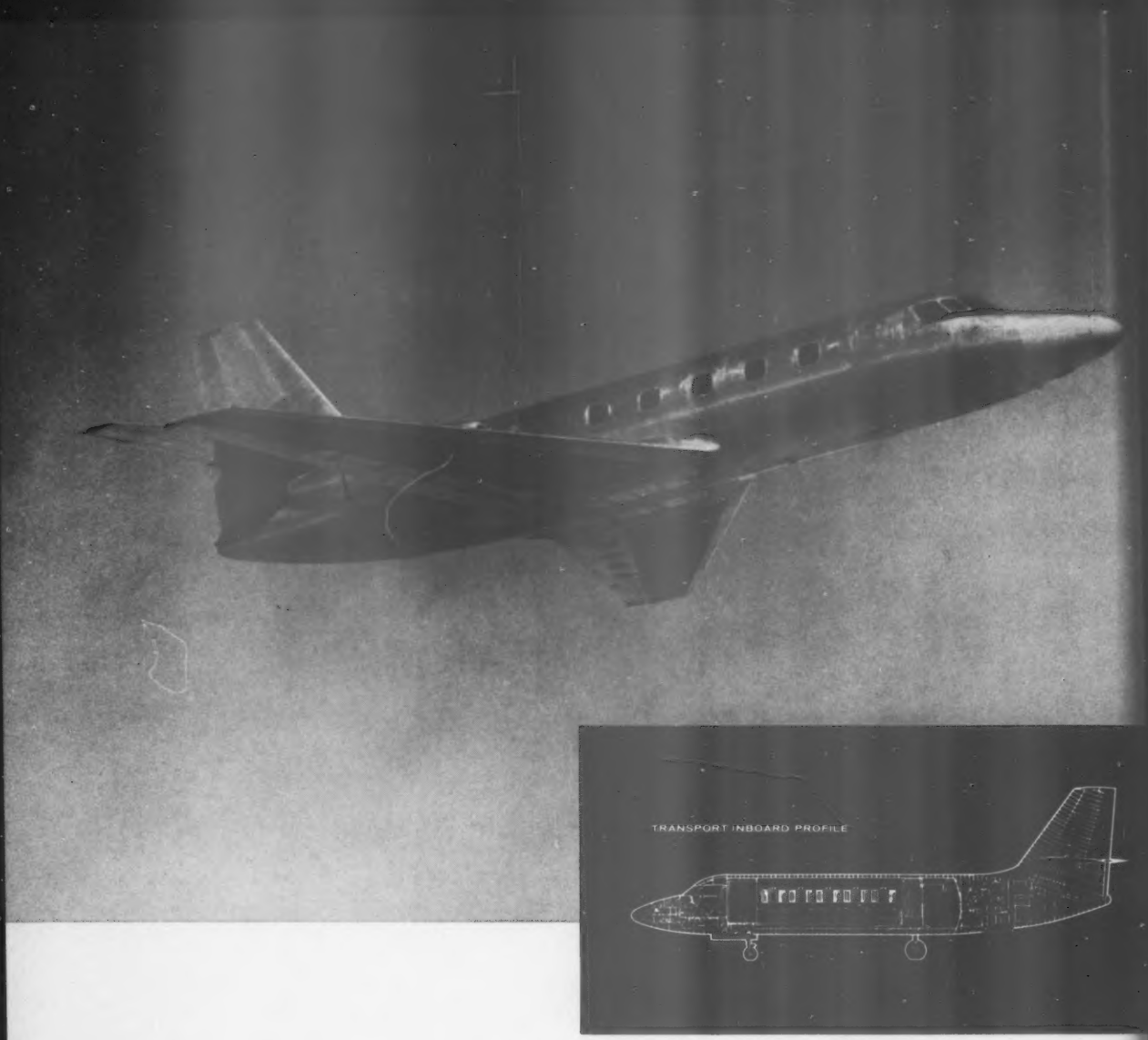


Department of Defense Budget Issue



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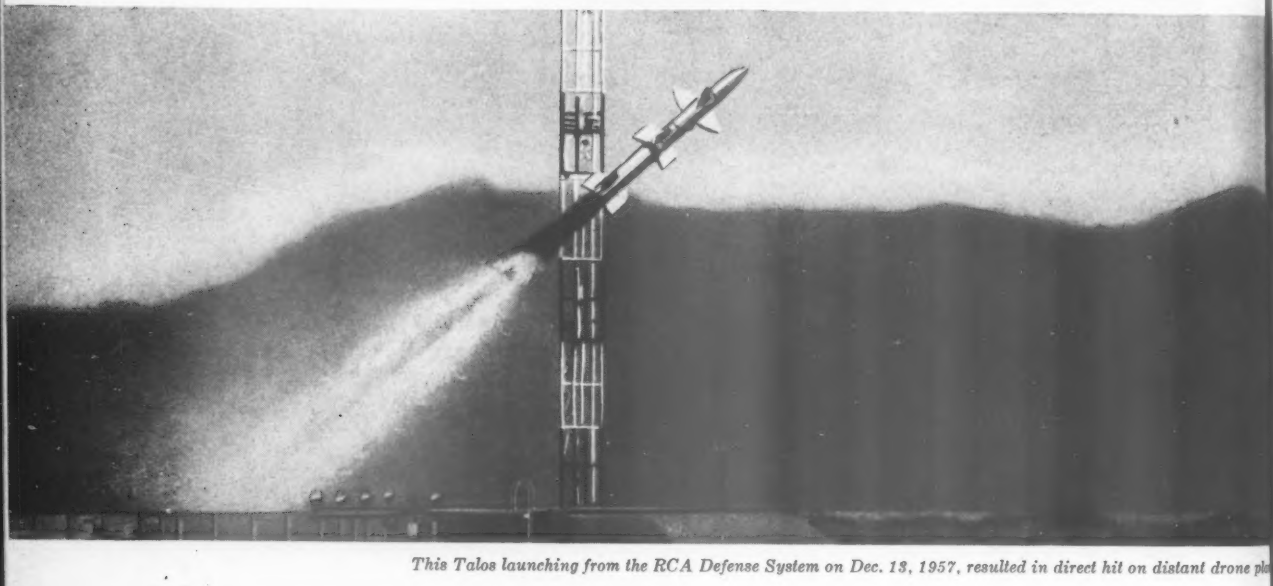

This Talos launching from the RCA Defense System on Dec. 13, 1957, resulted in direct hit on distant drone pla

The RCA Talos Defense System is the first *completely automatic* land-based system for launching and guiding missiles, and utilizes the Talos Missile developed by the Applied Physics Laboratory and produced by Bendix. The Defense Unit receives target signals from remote outposts, analyzes them with regard to number of attackers, location, course and speed. Next, computers determine the logical points of interception, order the missiles loaded on launchers, guide them at supersonic speed to the vicinity of the target, after which the missiles "lock" on the target and close in for its destruction. All without even the touch of a button! The RCA Talos Defense System, with its electronic equipment and guidance systems, was designed, developed and built by RCA as prime contractor, aided by many subcontractors. It was turned over to the U. S. Army on October 15, 1957, and is a missile milestone, exemplifying the continuing determination of American enterprise to secure peace with honor and justice.

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ARMED FORCES Management

PUBLISHED FOR THE ARMY, NAVY, AIR FORCE, COAST GUARD AND MARINE CORPS

FEBRUARY, 1958

FEATURING: DEPARTMENT OF DEFENSE BUDGET PLANNING

Departments

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ARMED FORCES MANAGEMENT **Volume 4—No. 5**

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In My Opinion

Understatement

It was good to see, in your January editorial, that you carried "problem 2" to the point where you found that a "new arbitrary decision . . . is needed in the delineation of roles and missions."

However, when you say that the last one "aggravates service rivalry" I think you are making an understatement. Logic says that it is the *cause* of the service rivalry. I have tried to make this latter point since 1950 shortly after I first started to study the role structure of the Unification Act. My impression from the public discussion of the Rockefeller Report today is that the report leans to the same view.

Leland B. Kuhre
Colonel, USA-Ret.

We chose the word "aggravates" after some thought in order to avoid implying that all service rivalry, i.e., pride in mission importance, is bad. However, Congress is keeping the Department of Defense in a good deal of hot water with its charges. We'd be interested in a service answer to this question—is interservice rivalry really hurting the armed forces?—Ed.

Department of Defense Organization Series

. . . It is a very complete and informative summary of the Department of Defense Organization. I shall certainly use it as a reference text.

Maj. Gen. Richard H. Carmichael, USAF
Director, Personnel Procurement and Training Headquarters, United States Air Force

. . . The Commanding General, this depot, was very impressed . . . He feels it is the finest piece of work he has ever seen on the subject and desires to have all of his key personnel, military and civilian, read it and have it available for guidance and reference.

Capt. C. V. Lanier, Sig C
Adjutant
Sacramento Signal Depot

. . . I am sure I will find it most informative and useful.

Brig. Gen. C. W. Cecil, USAF
Director of Management Analysis
Headquarters, United States Air Force

. . . Your September, October, November and December issues are the best reference material for a government representative that I have ever personally read. The field representatives of my company have been very complimentary of each and every issue of this series. Your magazine is being used as a training manual by our 156 branch offices throughout the United States.

A. T. Sims, Jr.
Government Coordinator
Addressograph Division
Addressograph-Multigraph Corp.

. . . The publication is considered of value as supplemental information to our staff and students regarding Armed Forces management.

Lt. Col. H. N. Zeigler, Jr., QMC
Secretary, US Army Logistics Management Center

. . . The material presented has a direct application for use in our Advanced Logistics Course . . . We would like very much to obtain 50 copies.

Colonel Eugene R. Magruder, USAF
Director, Logistics Education and Research Project
Air Force Institute of Technology

Copies of the reference volume are available for one dollar each.—Ed.

Error

In your Personnel Preview portion of the January issue I noted the article on the RAND Corporation in Santa Monica, Cal. Having just returned from a 13-month temporary duty assignment with the RAND Corp., I can't help but wonder how the people at RAND would feel about tying them to the Sperry-Rand Corp.

The newly formed corporation is the Systems Development Corporation —not Sperry. At least, this was the title when I left a few weeks ago.

Gordon R. Milne
Directorate, Supply and Services
Hill Air Force Base, Utah

Personnel Turnover

The staff at Continental Air Command has read with interest and appreciation your editorial views on "Personnel Turnover—Today's Toughest Military Problem," so succinctly put in your December, 1957, issue.

Our people thought well enough of the editorial to reprint it and distribute it to all units of the command. Many thanks for your cooperation.

Col. Allen H. Wood, USAF
Chief, Office of Information Services
Continental Air Command

EDITORIAL

Single Manager Financial Management

THE wheels of operation improvement sometimes grind with exasperating slowness. Independently, and without knowledge of what the others were doing, several persons in recent months have proposed what, in essence, would be a single manager setup for meeting the military monthly payroll. The separate suggestions were suprisingly similar.

One, that submitted by John L. Baber, Jr., was the result of the Army's Project Paydirt, a late-1957 campaign to encourage personnel to improve the operating efficiency of the Army.

The idea is nothing new. As far back as 1947, in some form or other, it has been proposed to the government.

In essence, to quote Baber, here's how it would work:

"With minor exceptions, all salaries, military pay, annuities, veterans and social security benefits, compensation, emergency and unemployment relief, also vendors and suppliers invoices, would be paid in each community by members of the deposit-insured banking system, or equivalent agencies where needed." In other words, the government, instead of issuing millions of checks each month, would replace salary checks with a system of directly crediting employees' bank accounts.

Every employee who now gets paid by check would provide the Treasury or his disbursing officer with the name of his bank. When pay day came, the bank would receive a lump-sum check equal to the combined salaries of its Government worker depositors. Then the bank, in turn, would credit the proper amount to the account of each employee.

Proponents of the plan claim that, once installed, the proposed system will provide continuity and automatic performance of the paying functions and a measure of protection against fraud not attainable under the present system. It would reduce the manpower requirement needed to make the present system work and eliminate "mountains of unnecessary paperwork." (The Army world-wide, for all purposes, issues some 2,300,000 checks a *month*. The Air Force, if it only paid civilian and military personnel once a month, needs nearly one and one quarter million checks.)

All three services would be using the same payroll and accounting methods.

"The proposed system can be installed and operated without disturbing the continuity of payment, without creating any new Government agency, and without the addition of a single employee." And besides, they claim, it would save the Government at least $500 million a year.

Published statements of opponents have been few, far between, and generally inconclusive. There may be valid arguments why the new idea will not work any better, if as well, as the present method.

However, the point which needs to be made here is that this idea has been drifting around Government circles for nearly 10 years and has yet to receive more than cursory attention. Why? It would appear that an idea which could save $500 million should receive an immediate and comprehensive analysis. Does the idea have merit or doesn't it? After a decade, there is still no answer. Such bureaucratic red tape is one of the reasons the daily press and the taxpayer find it so easy to believe many of the wild tales heard about military mismanagement.

Concerning the idea itself, the Air Force apparently feels it has some merit. According to Air Force Manual 173-50, issued 3 December, 1957, "If more than one employee designates the same bank, a single check may be drawn for the total amount and transmitted to the bank with a list showing the name of each employee and the individual amounts to be deposited."

It is normal practice, incidentally, for the United Kingdom Government departments to issue one check to a bank with a schedule requesting that the accounts of the individuals named thereon be credited with the amounts shown against their names.

The military budget is up. The cost of the hardware itself is up. It is imperative now more than ever before that the military departments attain an ultimate in operating efficiency. Will single manager control of disbursing activities be one of the ways?

At present speeds, it may take another 10 years—or longer—to find out.

How the Air Force Develops Budget Estimates

by Manuel J. Asensio
Lieutenant General, U.S. Air Force
Comptroller of the Air Force

This article is confined to the regular annual budget estimates which become part of the printed President's budget, and does not include supplemental estimates, or the "flash" estimates and others which are developed to meet various special requirements within the executive branch.

BEFORE covering the budget preparation mechanism and methods which have evolved in the Air Force, it may be helpful to review briefly the part played by agencies external to the Air Force, even before its formal estimating process begins. *Figure 1* depicts in chart form the guidance and direction received in connection with the estimates for a given fiscal year. Briefly:

1. *The Council of Economic Advisors* advises the President as to the economic aspects of Federal programs and policies. Its findings and recommendations may influence not only the total dollar amount but also, to some degree, the distribution of that amount among the various major programs of the Federal government.

2. *The National Security Council* advises the President as to the military and national security aspects of Federal programs, and thus its recommendations have a more direct ultimate effect upon the size and composition of the defense budget, and therefore that of the Air Force.

3. *The Bureau of the Budget* is the President's principal agency in the development of the Federal budget. It prescribes the form of the estimates, issues the annual call for estimates, which announces the President's policies for the budget year, economic assumptions and other guidance, and performs the final review and compilation of the estimates of all executive departments and agencies.

At the departmental level, that is, within the Department of Defense, further guidance is provided the services by the Office of the Secretary of Defense in the form of somewhat more detailed and specific guidelines on certain aspects of military programs, in amplification of the Bureau of the Budget's "call."

Decisions as to military programs and their impact on the budget are based, in substantial measure, upon decisions of the Joint Chiefs of Staff, which body advises the Secretary of Defense as well as the President and the National Security Council.

The Method

Turning now to procedures within the Air Force itself, our annual call for estimates is sent out to the several major commands and other estimating agencies in January of each year, for the fiscal year which will begin some 18 months later. (Since this call is issued 5 or 6 months earlier than the calls which we receive from the Bureau of the Budget and Department of Defense, it might occur that amendments to our initial call would have to be issued. However, unless some major differences were involved, such adjustments as might be necessary ordinarily would be taken care of in our headquarters review process.)

The Air Force call for estimates announces policies to be observed in preparation of the estimates, and makes references to our standing budget preparation instructions and to the appropriate series of program documents to which the estimates must be related. The call will also specify any deviations from previously issued guidance which may be applicable to the particular budget year.

The "program documents," to which reference is made, are prepared by Headquarters, USAF, to implement the Air Force portions of strategic and logistic plans of the Joint Chiefs of Staff, and for other purposes. They provide commanders with many factors such as projected personnel strengths, both military and civilian, planned number of flying hours, base utilization, unit deployment, etc. These and the many other factors provided, plus knowledge of his assigned mission or missions, and of the resources available or expected to be available to him, enable the commander to translate programs into dollar requirements as the annual budget estimate of his command.

Figure 2 depicts in graphic form the review process at Headquarters, USAF, and Office of the Secretary of the Air Force level, after the command estimates are received, usually late in July, with certain exceptions.

Within the Air Staff the estimates are reviewed both independently and jointly by elements of the Directorate of Budget and by the other directorates or offices directly concerned with the policy, planning and operational aspects of particular programs. These reviews are directed toward insuring conformance to announced policies and programs, the call for estimates, and other guidance which had been furnished, and toward consistency with the objective of performance of assigned missions, and

attainment of optimum combat capability, with maximum economy of resources. Reviewers also assess the validity of formulae employed in developing materiel and personnel resources required, and in correcting these to dollar requirements.

Upon completion of these reviews, the Air Staff recommendations are presented to the Budget Advisory Committee (BAC), which is chaired by the Director of Budget and consists of several other Directors, and Assistants to Deputy Chiefs of Staff, who provide the viewpoints of the operations, personnel, materiel, research and development, and reserve forces interests of the Air Staff. The Assistant Secretary of the Air Force (Financial Management), or his representative, serves as advisor to the BAC, and the Under Secretary and other Assistant Secretaries sit with the committee from time to time as observers.

Presentation of Air Staff recommendations is made to the BAC by representatives of the Air Staff offices primarily concerned with the various programs, and at times by representatives of the field commands as well. Those who make the presentations are questioned by the committee to the extent necessary fully to guide the BAC in its deliberations as to the adequacy, reasonableness and consistency of the estimates, and their conformance to current policies and programs. Upon conclusion of its deliberations, the recommendations of the BAC (including minority views if so requested by minority voters) are transmitted to the Air Force Council.

The Air Force Council is an advisory body to the Chief of Staff on many policy matters, among which is budgetary policy from the over-all Air Force standpoint. It consists of the Deputy Chiefs of Staff (which here, and hereafter in this article, includes the Comptroller of the Air Force, who is organizationally on the same level) and the Air Inspector General as regular members. In addition, certain Assistant Chiefs of Staff will sit with the Council, as added members when matters of concern in their particular areas of activity are for consideration. The Council considers the BAC recommendations and either accepts the estimates as submitted to it, or makes recommendations for changes. Its findings are then submitted to the Chief of Staff.

The Chief of Staff takes the final approval or adjustment action at the Headquarters, USAF, level; that is, his is the highest level within the Air Force at which the judgment of the military is exercised upon the estimates.

From the Chief of Staff the estimates go to the Secretary of the Air Force who takes the last official action, either approval or adjustment, within the Department of the Air Force.

The Reasons

While the system of consecutive reviews which has been described may seem somewhat complicated on the surface, actually it is less cumbersome and time-consuming than one might expect.

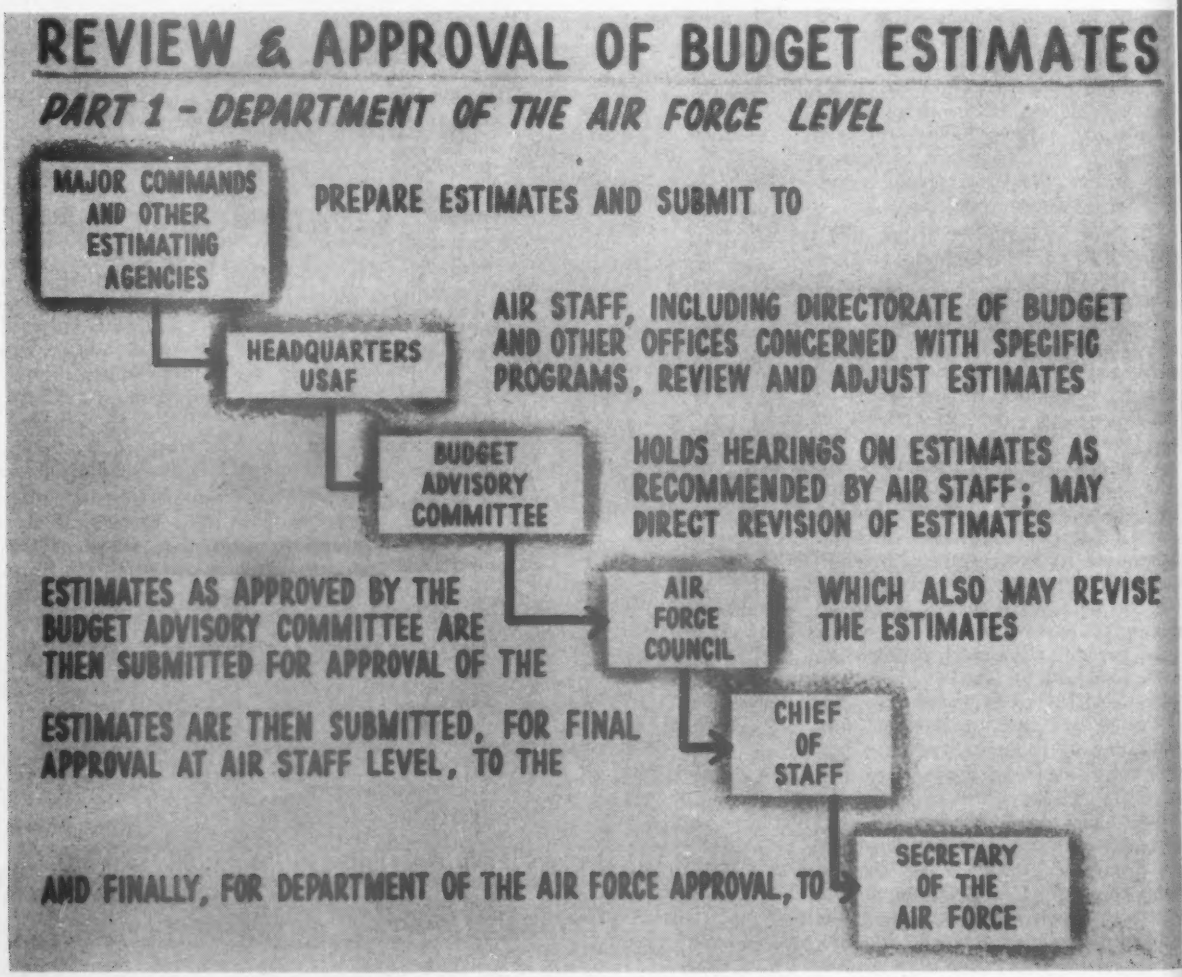
One reason is that the consideration of estimates at various stages involves different degrees of detail. It is fundamental, in the Air Force philosophy of budget review, that the degree of detail considered should be decreased at successively higher echelons of review. For example, the estimates submitted to the BAC by the Air Staff are not as detailed as the material received by the Air Staff from the major commands. Similarly, the estimates which the BAC submits to the Air Force Council are less detailed in scope than those it receives from the Air Staff.

Another factor which serves to expedite the reviews and to minimize revisions at successive echelons is the cross-representation, in effect, which exists among the various reviewing bodies. To illustrate, the Air Staff recommendations are developed, in large measure, by subordinates of members of the BAC, and thus the latter officials are kept in touch with development of the estimates continuously, in advance of the BAC's deliberations as a body. In turn, the members of the BAC are subordinates of the Deputy Chiefs of Staff who are on the Air Force Council, the next higher echelon of review.

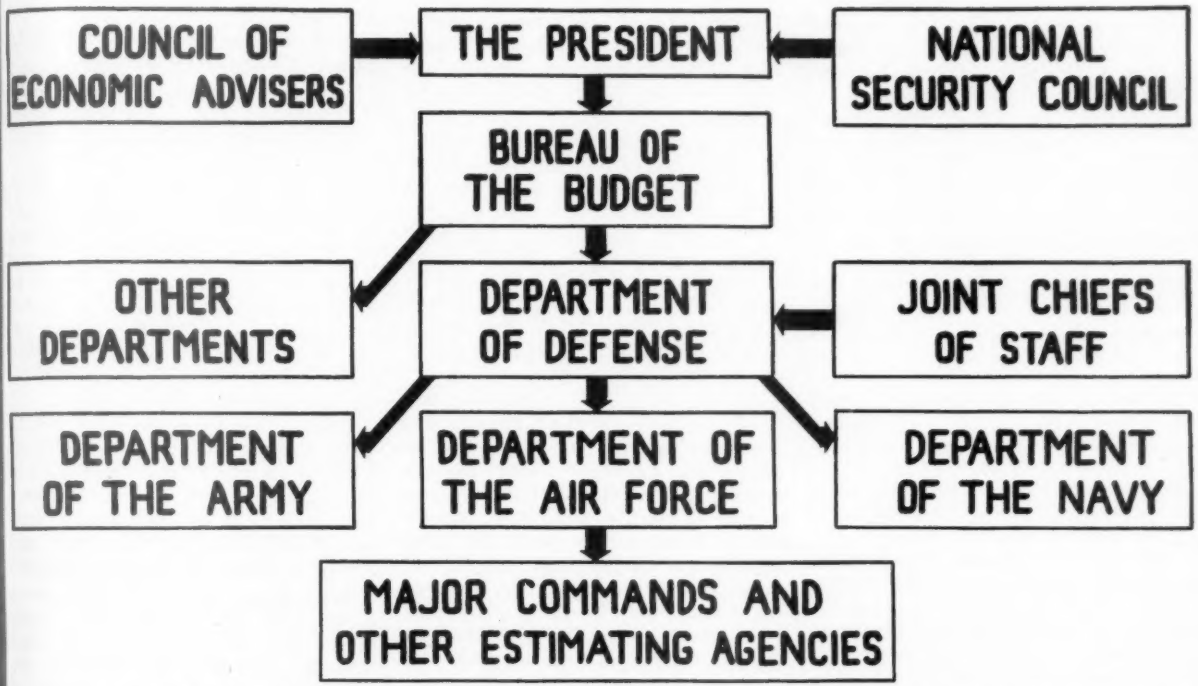
The Office of the Secretary of the Air Force is also kept abreast of the development of the estimates through attendance of Assistant Secretaries or their representatives at sessions of the BAC.

And finally, processing of our estimates is facilitated materially by the flexibility that exists within and between the Air Staff and the Office of the Secretary in all their dealings, including budget estimating. While we have, and observe, certain chains of command and channels of communication, still it is possible and proper—and in fact it is commonplace—for a Director who is subordinate to one Deputy Chief of Staff to deal directly with a Director under another Deputy, on matters of direct concern to both of them, without having to deal through their respective superiors. Again, a Director or a Deputy Chief of Staff may deal directly with an official at Secretarial level without necessarily having to deal through the Office of the Chief of Staff.

We have found our internal review procedures effective, not only in providing a thorough and detailed review of the estimates as such, but also in insuring that all appropriate interests are represented in such reviews, and that the final estimates as submitted for extra-Air Force review are realistic and consistent with defense plans, production capabilities, and with all other considerations which might affect the size and scope of the estimates at the time they are submitted. In seeking the attainment of that objec-



FLOW OF GUIDANCE AND DIRECTION IN BUDGET FORMULATION



tive, those at any internal Air Force review echelon can, and do, recommend such increases as they deem necessary in any appropriation, program or project, and do *not* seek only to reduce.

Having thus covered the internal Air Force organization for budget estimating, we have, of course, left unanswered a number of questions, and have not dealt with a number of problem areas.

A basic question, of course, is "What determines the size of the Air Force budget request each year?" The answer to this must be broken down between those factors which are properly within the cognizance of, and to some extent susceptible to being influenced by, the Air Force itself, and those which affect the estimates after they are submitted by the Air Force.

Fundamentally, and to the extent that the Air Force can so influence the ultimate outcome, the size of the Air Force budget request is determined by but one thing—military requirements. Ideally, we would compute what we need to perform our missions at the given point in time or during the time period, to which the budget is related, in the way of men, machines, materiel, units and bases; deduct what we have, or have in the process of acquisition, in such resources; and price out the difference, which would constitute our budget estimates.

The Problems

However, life in the budget estimating field is not that simple—and fortunately so for the taxpayer, for if our budgets were formulated on that basis, the budgets of today would appear most conservative by comparison. What, then, are the factors which tend to bring our estimates down from the maximum that would obtain under a "no-holds-barred" and "military requirements only will decide" basis, to the estimates which actually are submitted by the Air Force?

First, even though there is a demonstrated military requirement for, say an aircraft with certain characteristics, in 1961, there would be no point in providing production funds for that aircraft in our FY 1959 budget if we knew, or had excellent reason to believe, that the aircraft would not be ready for production until 1965. We have, then, the question of *timing*, not only of the capability of satisfying requirements, but also of securing the funds to permit such satisfaction. This factor extends not only to production of aircraft or missiles, but also to construction of installations, procurement and training of personnel and many other segments of our overall programs. We attempt to arrive at a realistic, time-phased inter-relationship among these many factors, and our degree of success in this respect is reflected to some extent in the differences between the total of major command budget estimates and that amount which is actually recommended by the Air Force to higher review authorities. Such differences may run to several billion dollars.

Second, we are realists. We know that an estimate, compiled strictly on the basis of pricing out maximum military requirements considered necessary, would never "get off the ground." It is difficult to conceive of circumstances, including those of active participation in total war, when either the Chief Executive or the Congress would accept the estimates of any department and stamp them "Approved" as received. Therefore, our aim is for the optimum, rather than for the maximum, and in so adjusting our sights we "discount" our estimates in advance, in many areas, before we ever submit them to higher authority.

Estimating for the optimum, rather than the maximum, in satisfaction of stated military requirements, always

involves calculated risks, in varying degrees. Such risks are inherent in the military functions budget of any military department in any year. These risks may relate to timing, to quantities, to quality, or to any combination of these.

Once the Air Force estimates have been submitted to the Office of the Secretary of Defense and higher levels, factors other than military requirements exert greater influence upon them. These involve economic, political, and international relations considerations, comment upon which is not properly within the scope of this article. Suffice it to say that at each echelon the Air Force has its day in court, and in most cases the opportunity to appeal decisions which are considered inimical to its legitimate interests. Once the final decisions are made, however, it is our job to adjust our programs to the extent necessary and get on with the job of providing the degree of combat and support capability that our resources will permit.

Still to be Solved

Turning now to some problem areas, one is the length of the budget cycle, now some 18 months. A major problem is the fact that the programs under which a commander must plan and operate at the beginning of a given fiscal year may be drastically different from those which were in effect when he was asked 18 months earlier to prepare budget estimates for that year.

Our estimate for FY 1959 is somewhat of a classic in this respect. Our call for estimates for 1959 went out to the major commands in January 1957 and was based upon the approved Air Force programs then in force. The commands prepared their estimates accordingly and these began to arrive in the Pentagon late in June. In the meantime, however, the expenditure–debt ceiling crisis which developed in FY 1957, and became clearly evident late in that fiscal year, had necessitated substantial reprogramming and revision of future budget forecasts. This largely nullified the efforts of the commands, since the reprogramming affected FY 1959 substantially, as well as FY 1958. Because of these actions, and the timing of them, it became necessary for us to prepare the 1959 budget at headquarters level, using such parts of the command submissions as remained valid.

Perhaps this experience has pointed the way to partial solution to the problem of the long budget cycle, i.e. the preparation of the budget at headquarters, rather than having it evolve through headquarters review and adjustment of command-prepared estimates. It is doubtful, however, as of now, that we can or should go all the way down that road, for it is axiomatic that when we charge a commander with performance of a certain mission, we must also give him a voice in the determination of the resources necessary to its accomplishment. Some middle ground approach between the two extremes may eventually be adopted.

Another major problem which should be highlighted, and upon which suggestions from every reader are invited, is the development of an adequate degree of "salability" for some of our appropriations and programs. Notable among these is our Operation and Maintenance appropriation, which is the *sine qua non* to effective utilization of almost all of the other funds appropriated to us.

Strange as it may seem, one can justify more clearly the appropriations for the procurement of jet bombers or guided missiles, upon a clear demonstration of the efficacy of the weapon system in relation to a given enemy threat, than one can prove the need for the fuel to fly these vehicles "x" number of hours in a given year, or the travel funds to get military personnel to training sites and then to operational sites of such weapons.

It is also difficult to secure the proper degree of balance between funds available for procurement of aircraft and missiles and those available for procurement of the associated—and essential—ground support equipment, and the other ground equipment necessary to the performance of our missions. We have not yet mastered the art of effective presentation to the point of demonstrating incontrovertibly these requirements which by virtue of our military experience, we know to be just as valid as the need for the basic items.

Excessive emphasis on the past, coupled with an oversimplified statistical approach to the evaluation of estimates, often leads to arbitrary adjustment of estimates and necessitates protracted and detailed hearings, and the submission of voluminous and detailed "back-up" material in support of the service budget requests.

This article has outlined the Air Force methods of developing budget estimates, explained some of the major determinants of the size and scope of such estimates, and highlighted a few of the problem areas in budget management. We are actively and continuously working towards the resolution of these and other problems, and progress has been noted, even though it has been "slow but sure" thus far.

New Ideas

Kit Stockage Replaces Component Parts

Reported by: Technical Division, U.S. Army Engineer Maintenance Center.

Improvement: Stockage of Kits in Lieu of Component Parts.

Program Affected: Central Supply Activities.

Background: Component repair parts stocked in Engineer military supply system for generators, starting motors, distributors, fuel inspection pumps and governors were in excess of 10,000 line items. This stockage resulted in the procurement, storage and issue of many mortality type parts of low-dollar value. It was considered that if repair kits were available, many individual parts of short life expectancy could be removed from the supply system.

Before Improvement: From 18 to 20 bins were occupied by the repair parts for each type, model and make in the supply system. The procurement and issue costs of such repair parts were high because of the low costs and the great amount of handling required.

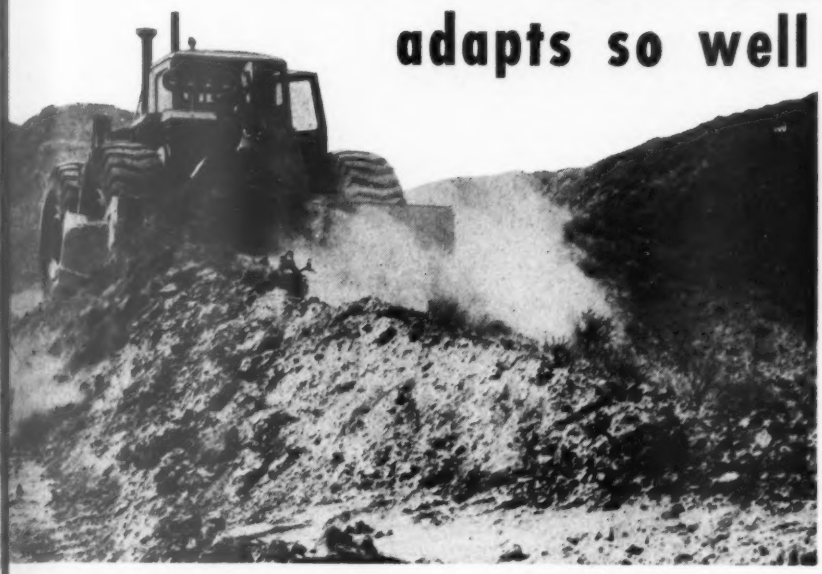
After Improvement: Contacts were made with the manufacturers concerned and agreements were obtained from the manufacturers to supply repair kits in lieu of a low quantity of inconsequential parts. The repair kits have now been established in the supply system. The manufacturers thought so highly of the idea that three adopted it also for their commercial trade. This improvement will result in the deletion of an estimated 7,000 mortality-type line items of low-dollar value from the supply system. Other results of this improvement will be a decrease in procurement, handling and issue charges, the release of a great number of storage bins for other use and a decrease in inventory stocks.

Gains: The savings from the use of repair kits versus parts now in the system is estimated conservatively at $5,000. The greatest savings will be in the deletion of the 7,000 storage items for CONUS and worldwide which are allocated in both using units and field maintenance levels. Complete data is not available on the savings realized since worldwide storage and issue are involved.

Management Techniques Used: Employee suggestion.

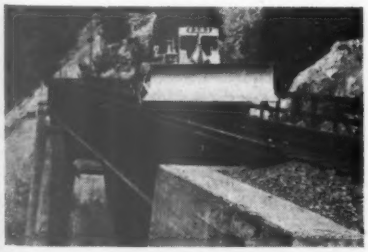
• Modern missiles may have to travel several hundred miles over our own territory and a comparable distance over enemy territory before finding the most profitable and critical targets.

Why this *FAST-STEPPING TRACTOR* adapts so well to military use



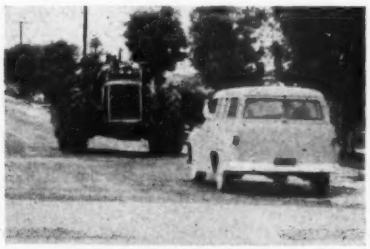
In drawbar ratings — the most common standard of evaluating tractors — there is little difference between the 210 hp LeTourneau-Westinghouse Tournatractor® and crawler-tractors of its price, weight, or horsepower class. At speeds under 2 mph, crawlers normally offer more pounds-pull. At usual working speeds, over 2 mph, the advantage is definitely with Tournatractor.

Why, then, is Tournatractor so much better suited to military work? Because it offers more of the features necessary in military use — *mobility, speed, ease of operation, and ease of maintenance.* Here's how:



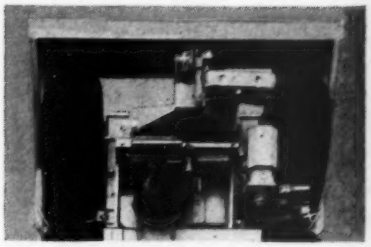
POWERED MOBILITY

Tournatractor goes *anywhere,* under its own power . . . along highways, city streets, or cross-country . . . through sand, mud, bombed-out areas. Its wide, low-pressure tires straddle railroad tracks . . . cross trestles, bridges, tunnels. You need no loading details, no special transport equipment. Operator simply hops on and goes . . . via the shortest route. Tournatractor can be working on a new assignment 30 miles away in less than two hours.



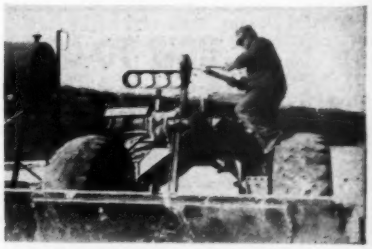
CONVOY SPEED

Tournatractor runs job-to-job at speeds 2 to 3 times faster than crawlers. *Performance* is speedy, too. Pick-up is fast, due to instant shift and sealed, anti-friction drive. Maneuvering is quick, and easy . . . you turn 180° quickly with skid-type steer. With air-actuated power shift transmission, you shift gears *on the run,* losing no momentum. Even reverse shift is instant . . . and you can back up faster than some crawlers can go forward.



EASY OPERATION

Military manpower changes; you often have several new operators on one job. With easy-to-run Tournatractor, new men become good operators *fast.* Controls are simple, easy-to-understand, easy-to-reach. One-hand, one-motion clutchless shifting means operators will use higher speeds more often. Easy operation eliminates end-of-day slow-down — keeps men working at top efficiency, fresh and alert. Safety features give them confidence to work faster.



LOW MAINTENANCE

Tournatractor is easy to maintain in any climate. Its simple design eliminates many parts . . . for example, 4 tires replace over 500 moving parts of a track assembly. Tires also act as huge shock absorbers . . . and clean themselves! Extensive oil-enclosures mean less lube points and less repair. Trouble-free, weatherproof electric motors eliminate complex hydraulics. Torque converter (standard equipment) cushions damaging shock loads from engine and power train.

LeTourneau-Westinghouse products are in use around the world . . . and service facilities are available everywhere. Let us show you how Tournatractor can serve better, in military use, than any other tractor.

CT-1345-ML-1

LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Washington News Briefs

Waste Investigation

The Senate Permanent Investigating Subcommittee, headed by **Sen. John McClellan (D-Ark.),** has urged Congress to make a world wide investigation of waste and excessive supplies in the Army and Air Force. The subcommittee reported it had found "reckless waste and excessive surpluses" in the **Northeast Air Command.** Because of this, a check of all commands should be made. For example, the report said, the Army has $1 million of a type of spare parts on hand when it needs only $75,000 worth.

No Reorganization

Don't look for any significant change in the **Department of Defense** organization for some time to come, unless precipitated by extreme Congressional pressure. Both **President Eisenhower** and **Secretary McElroy** are taking advice of the Roman general Romulus and making haste slowly.

In a recent press conference, Eisenhower backed away from making any flat statement that the **Pentagon** needs a change. McElroy has let it be known he is asking the advice of **Joint Chiefs of Staff Chairman Twining** and former JCS chairmen, **General Omar Bradley** and **Admiral Radford,** among others about the JCS set up; but he emphasized they were *not* functioning as a committee.

On the question of a single chief of staff, the services line up this way: Air Force General White favors it; the Navy's Admiral Arleigh Burke is opposed to any change in the present structure; and Army General Taylor leans to the Navy side of the argument.

Honeymoon Over

The unabashed outpouring of testimony by **key Pentagon officials** to **Sen. Johnson's Senate Preparedness Subcommittee** is due to end. Lulled by Sen. Johnson's smiling countenance, DOD brass hats have overextended themselves in frankly airing their gripes to the committee only to see the Senator make political hay of the remarks in the next day's paper—at the expense of the witnesses and DOD.

Notable examples: **Maj. Gen. Bernard Schriever,** USAF, and **Lt. Gen. James Gavin,** USA. DOD witnesses are being trapped in the web of criticizing their superiors which runs contrary to the grain of all military training. First man to buck—**Gen. Nathan Twining,** who made headlines recently attacking the way Johnson's investigation is being handled.

Pay Increase Likely

Consensus of Capitol Hill opinion makes it likely some sort of **pay increase bill** will pass in **Congress** this session. Too early to tell, however, how close to the **Department of Defense** proposal the final bill will be. The Pentagon is not, at the moment, doing any hard lobbying for the bill because they feel, justifiably, that the cold facts are so irrefutable they don't need any promotion. Be that as it may, military pay bills are so wrapped up in political gobbledygook that the Congressional temperament will determine, to a large extent, how sound the final pay bill is. At the moment, Congress, in spite of their headline comments, appears more interested in maneuvering for this year's elections than they are in any non-partisan attempt to catch up in the Cold War.

Personnel Cuts

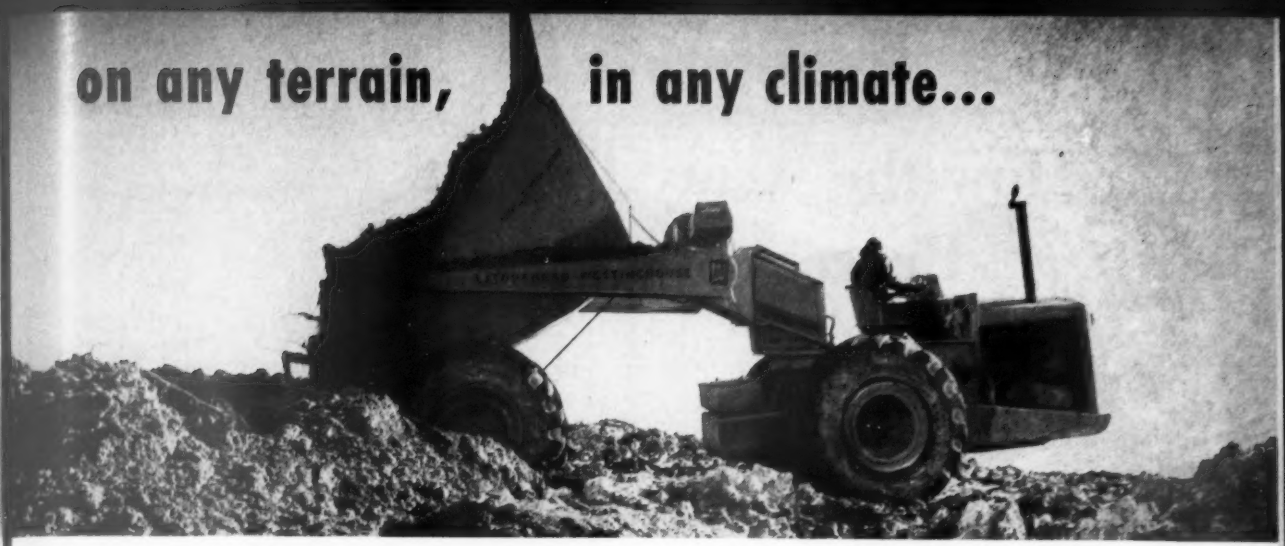
Both Dan C. Kimball, president of **Aerojet-General Corp.,** and **Lawrence A. Hyland,** vice president and general manager of **Hughes Aircraft Co.,** recommended drastic cuts in **Defense Department** personnel in recent testimony before the Johnson subcommittee.

Kimball said he would lop off from 75% to 90% of the civilian employees in order to increase efficiency. He stated that it is not necessary to have a civilian looking over the shoulder of every military person. Hyland suggested "20% across the board as a first step" and added a management review may disclose further desirable reductions.

Kimball also would eliminate the power of the **Director of the Budget** to stop funds appropriated by Congress for missiles. "The **Bureau of the Budget slows down** the Defense Department," he added. Hyland said, "I want to emphasize that both the national and military budget offices should stick to their knitting and stop trying to operate the services."

Production Study

A combined French-Netherlands team of 30 technical military and industrial experts arrived in the U.S. recently to visit military equipment production and testing facilities. The group will study technical problems associated with the development and production of modern military equipment.



these heavy-duty haulers save time three ways

You can put your off-road hauling of dirt, rocks, and other heavy materials on a fast, mass-production basis with LeTourneau-Westinghouse Rear-Dumps. Here's how they save time on all three basic operations: loading, hauling, and dumping.

fast loading

Tournapull's 90° turn-ability gets L-W Rear-Dumps under shovel *quick*. Wide, clear top opening gives loader big, easy target. Clean, tapered bowl flows materials toward center, cushioning load shock. Low, wide design cuts spillage.

steady hauling

Exceptional pull-power, traction, and gear selection keep loads moving steadily cross-country or over rough haul roads at fastest practical speeds. Tires give top flotation; low gravity center assures stability.

quick dumping

Electric hoist motor tilts body sharply, for *clean* unloading. Body lip extends beyond rear wheels, to cast material out and away. Fast, *precise* electric controls permit instant dump, controlled spread.

rough going no problem

LeTourneau-Westinghouse Rear-Dump bowls are powered by world-tested Tournapulls — rugged, 2-wheel prime-movers. 'Pulls go anywhere — through mud, snow, floods, sand, bombed-out areas. They get needed traction in rough going with help from exclusive L-W power-transfer differential . . . which automatically transfers up to 80% of power to wheel with the best footing. In soft footing? Simply "duck-walk" out, using 90° electric kingpin power-steer to swing prime-mover from side to side.

fingertip switch control

Dumping and steering are actuated by fingertip electric switches. Giant air brakes, combined with Electro-tarder for auxiliary flywheel brake power, add safety. Maintenance is low in any climate, because highly simplified Tournapull® Rear-Dumps eliminate so many unessential parts. All-welded, reinforced steel bowl resists wear and shock. Experienced servicemen and operators are available around the globe.

Check the advantages of LeTourneau-Westinghouse Rear-Dumps for military use. Ask for complete specifications. Rear-Dumps available with 11, 22, and 35-ton capacities.

R-1346-ML-1

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Where quality is a habit

How the Army Budget Process Works

by Lt. Colonel O. C. Culbreth

Chief, Operations Branch, Budget Plans Division, Office, Director of Army Budget, OCA

THE DIRECTOR of Army Budget is the Budget Officer of the Department of the Army as well as Chairman of the Budget Advisory Committee. This committee has final responsibility for reviewing budget estimates and recommending fund requirements through the Comptroller of the Army to the Chief of Staff. He also monitors the presentation and defense of the estimates before the Office, Secretary of Defense, the Bureau of the Budget, and the Congressional Appropriations Committees.

The staff of the Director of Army Budget makes a detailed analysis of each budget program to ascertain that it is properly justified and in balance. This analysis determines the position of the Director of Army Budget, and is presented during the annual review before the Budget Advisory Committee in arriving at the staff-formulated budget.

For years, the Army Budget was constructed along organizational lines, *i.e.*, Ordnance Corps, Signal Corps, etc. While this type of budget did reveal amounts for equipment, supplies and construction, there was no way of readily drawing together the program costs of Army training, or the cost of operating a particular post, camp, or station. Funds were appropriated in more than twenty different, not too relatable, segments, and our accounts were kept on the same basis.

The performance budget concept as embodied in Public Law 216 (Title IV), 81st Congress, 10 August 1949, places emphasis upon functional programs and activities, the cost of performance, and the segregation of operating from capital programs. With this basic authorization, the Office, Director of Army Budget has made considerable progress in achieving its objective. From more than twenty appropriations previously used in budgeting, there are now eight major appropriations and three minor ones. The next subdivision of classification under the appropriation, Operation and Maintenance, Army, for example, is now reduced to eight budget programs for FY 1958 from the 16 budget programs used in FY 1956. For the next classification, only 48 fiscal projects are now being utilized in Operation and Maintenance, Army as compared to the 137 projects used in FY 1956.

This new structure meets the requirements of the Hoover Commission in its Report on Budgeting and Accounting. The Report stressed that the all-important thing in budgeting is the work or the service to be accomplished, and what that work or service will cost, or so-called cost of performance budgeting. Under this concept, attention is centered on the function or activity—on the accomplishment of the purpose. It discloses both accomplishment and cost in a clear light before the Congress and the public.

The implementation of the Army Command Management System is a major achievement in fulfilling the objective established by Public Law 216. This system is a management aid designed for the commander which gives him financial flexibility, insures him current and accurate information which he needs for relating his program to his resources, and provides him with cost data to back up his fund requirements.

Perhaps the foremost advantage and improvement which has been gained thus far from the adoption of the performance approach to budgeting under Public Law 216 is that there can be concentration upon the programs and functions which must be undertaken by the Army in carrying out assigned missions and objectives. By grouping related activities into budget programs and into functional appropriations, requirements can be assessed in total rather than having to view these same requirements in the piecemeal fashion which was necessary under the former budget structure which stressed organization. The budget is now an integrated Army budget rather than an assemblage of several Technical Service, Administrative Service, and miscellaneous budgets. Thus, there has been gained an additional and very valuable means of program control while at the same time retaining, through our funding procedure, the operational control which was formerly possessed.

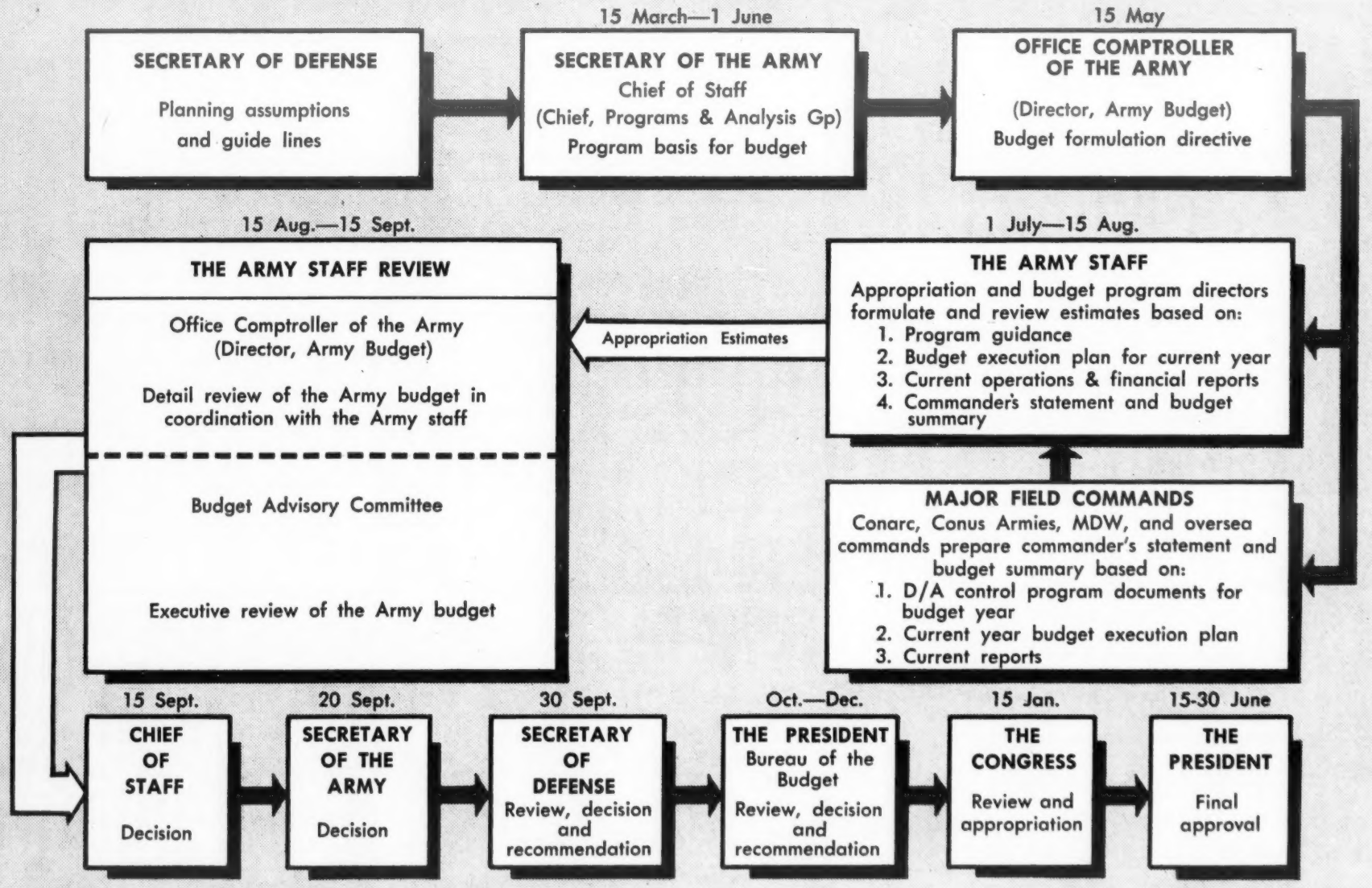
The program concept in budget formulation requires much greater participation by the Army Staff, that is, those agencies within the Departmental staff which are concerned with the development of policy and the supervision of the over-all Army program. The Comptroller, upon receiving the "Commander's Statement and Budget Summary" from the operating agencies, calls upon the Army Staff Program Directors to assist in the evaluation, analysis, and consolidation of those requests. In this way, he is aided by individuals who have the concern not only of individual operating services and commands but of the Army as a whole. One immediate result is better coordination and more critical review, which leads to a balanced distribution of resources to meet the many competing needs.

Still another advantage accruing directly from the performance-program approach is the considerable increase in attention to, and awareness of, the financial aspects of Army operations. Further, emphasis is placed upon the management of funds supporting programs, *i.e.*, funds for training, for medical care, for logistical support, rather than upon "Quartermaster money," "Engineer money," and the other organizational fund allocations.

The Army Program System

The Army Program System is a means which provides the framework and processes for planning Army activities by time period, for executing the work planned, and for reviewing and analyzing progress to determine whether accomplishments measure up to objectives. It provides for development of a balanced 5-year program in terms of forces, facilities, and material in accord with the war plans, the available resources, and the anticipated fiscal authorizations; for formulation

THE BUDGET FORMULATION PROCESS



and execution by major subordinate agencies of annual programs in accord with the 5-year program; and for continuing review and analysis of performance at all levels. Accordingly, the major functions of the Army Program System are:

a. To formulate and record the major objectives of the Army over the 5-year period;

b. To furnish adequate and timely guidance to the Army Staff and major subordinate commands and agencies which will enable each to prepare its annual program and execution schedules;

c. To establish a sound basis for the formulation, justification and execution of the Army budget in support of the approved program; and

d. To permit continuing evaluation of performance in the utilization of available resources.

The Army Budget System

The budget is the principal vehicle by which the Army informs and seeks approval from the Congress on its annual program for current operations as well as its program for long-term readiness. It may be said, then, that it is the basic element and originating point for effective financial management. Upon approval by the President and the Congress, it becomes the basic guide for carrying out the program which has been proposed; it authorizes the operations involved, and it clearly establishes the purpose of the Army organization for the period which will follow. Because of the key position which the budget occupies, it also serves as the device for coordinating and implementing Army plans and Army programs. This is a fact that is sometimes not accepted for planning activities or programming or, of course, operations. It is, rather, a companion piece to all of these as well as a valuable aid to management if properly used.

Budget Guidance—so long as military programs are a major consideration in the formulation of National policy, it must be recognized that firm decisions and final guidance will normally be forthcoming only as the period of execution becomes close at hand. This condition does not eliminate the need for long-range nor mid-range planning, programming, and budgeting. On the contrary, current operations can only be successfully carried out and efficiently conducted if they have been carefully planned and programmed. The situation on guidance which has been set forth above does, however, indicate a requirement for realism in the degree and detail which should be undertaken in various periods during the planning, programming, and budgeting cycle. There is a tendency to do too much too far in advance while at the same time waiting too long before initiating the final actions which will be required for the formulation of the final decisions, *e.g.*, the budget itself. This second influencing factor of guidance points up what should be considered as the foremost, or certainly one of the foremost, problems in administrative management in the Army as well as in the other military departments today, *i.e.*, timing and scheduling of planning and budgeting actions.

Formulation and Execution

It is now generally recognized and accepted that, in point of time, budgeting may be considered in two distinct and major phases, *budget formulation* and *budget execution*. During the period of budget formulation the emphasis and interests are upon the missions of the Army and those programs and functions which must be undertaken to meet or accomplish these missions. The budget formulation process is pointed toward fulfilling the demand for decision. It reaches its end when authority is given to carry out a particular plan and associated functions. Specifically, the budget formulation process is concluded with the approval by the President and the authorization by the Congress. Budget execution, on the other hand, is concerned with operations and the operating agencies involved in the programs and functions which have been approved or which are being considered for approval. The budget execution process is pointed toward fulfilling the demand for effective and economical use of funds. The two phases overlap and are directly dependent upon each other. The operations which have taken place during one year influence the programs and budgets for the future years just as the program decisions which are made during budget formulation direct the execution which will take place during the budget year. The Army Budget System, therefore, connotes two things. First, the accomplishment of a program as finite result and, second, the accomplishment of specific operations, that is, the management job.

The formulation of the budget is a part of the Army over-all planning and programming which precedes the year of operation. It is during this period that the decision is made on how much money the Army should ask for in its annual budget request. There are a number of factors which influence this phase of budgeting.

Perhaps the three factors having greatest influence are (1) the current international and national situation, (2) availability, quality, and timeliness of budget and program guidance from higher authority, and (3) extent and availability of data on current operations.

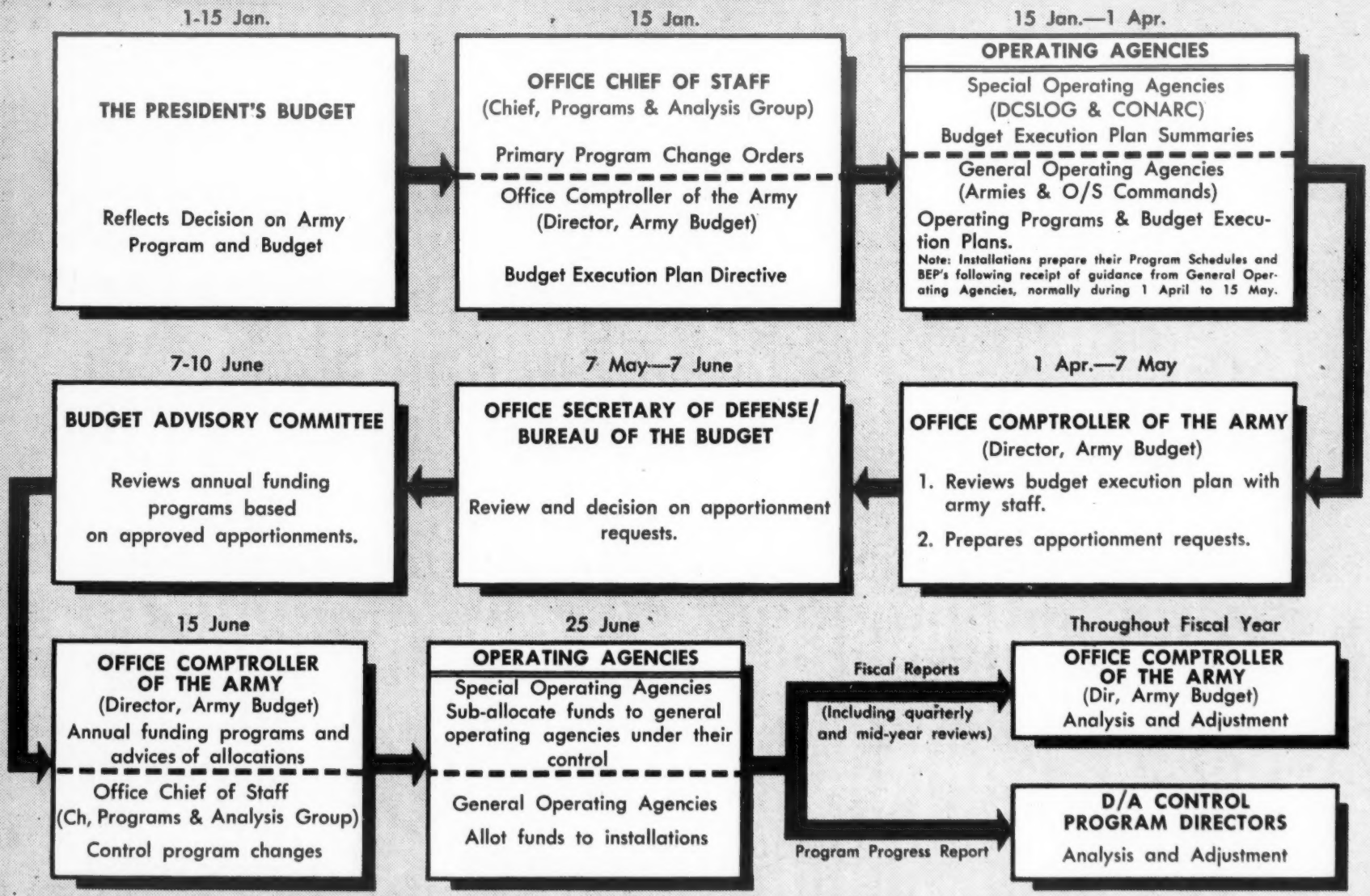
The past few years have witnessed major eruptions in the international situation, delays in guidance, masses of only partially usable data in the field, and many changes being made in program guidance and assumptions by the Office, Secretary of Defense, and the Bureau of the Budget during their reviews. Ideally, guidance should be available for the formulation of an estimate in January, 17 or 18 months prior to the enactment of appropriation legislation.

Formulation Process

The Army has adopted formulation procedures which recognize that initial program and budget guidance is generated within the Department of the Army and that firm and definitive Program approval will usually be forthcoming only after budgets are developed, submitted and reviewed by higher authorities. Effective participation by field agencies can be obtained only when the Department of the Army is in a position to issue relatively firm guidance to its major commands, including the CONUS Armies, overseas commands, and the Army services. Research reveals that field commands become interested in the target fiscal year primarily after programs and operations for the current year have been squared away and are well along. Taking these considerations into account, the Army has adopted procedures which place a greater responsibility for budget formulation upon the Army departmental staff.

Figure No. 1 illustrates the flow of budget formulation actions under our latest concept. It may be noted that the first block shows the Secretary of Defense issuing planning assumptions and guidelines but that no date has been attached to this block. The reason for this is that under our present concept of formulation, it is planned to proceed on a relatively standardized cycle, whether or not adequate guidance has been received from higher authority. The formulation of the Army budget is initiated on the basis of Army-developed guidance, if necessary, as has been done in the past. This guidance will be based upon experience of the current year, *i.e.*, the year in which the programs are prepared, and upon the President's decisions on the budget for the year immediately ahead which are normally announced on or about January 15.

THE BUDGET EXECUTION PROCESS



Normally, between the period 1 March and 10 May, the Program planning documents are published and distributed to operating agencies, and by the middle of May the Director of Army Budget issues technical instructions for the preparation of the budget. These instructions are entitled the "Budget Formulation Directive." Between that time and 1 July, both Department of the Army staff and field agencies are engaged in buttoning-up the formulation cycle and the execution planning for the funds about to be appropriated.

Following the completion of the budget preparation by the Departmental staff, it is reviewed and analyzed by the Army Staff who serve as the Budget Program Directors, and who for the most part are also the Program Directors. Recommendations are submitted by the Budget Program Directors to the Director of Army Budget. At this point, a review is conducted in the Office, Director of Army Budget for the purpose of determining whether the estimates conform to the program guidance and whether the financing is sound, economical and balanced. The estimates are analyzed in detail and recommendations are submitted by the Director of Army Budget to the Army Budget Advisory Committee. The Director of Army Budget is Chairman, ex officio, of that group. Review by the Budget Program Directors, Office Director of Army Budget, and the Budget Advisory Committee constitutes the Army Staff Review and will normally take place between 15 August and 15 September.

Field Participation

Although the bulk of the preparation of estimates is done by the departmental staff, the major field commands and operating agencies of the Army actually participate in this operation through the submission of an annual "Commander's Statement and Budget Summary." This document is the substitute for voluminous and detailed budgets previously required from the field nearly one year in advance. It is composed of two sections, the first being the commander's statement, which sets forth his estimates of what the annual program documents mean to his command based upon his own staff's appraisal. The second part, the budget summary, contains the commander's estimates of the budgetary impact on the proposed programs. The impact is presented in terms of differences—that is, he compares his expected fund availability for the current year with the requirements for the budget year and points out activities which will require either more or less money than in the current year. These commanders' statements and budget summaries are submitted to the Army staff in sufficient time to be used in the staff preparation of the annual budget estimates.

Advisory Committee

The Budget Advisory Committee conducts its review normally between 15 August and 15 September. This committee, headed by the Director of Army Budget, is composed of senior General Officer representatives of the Army Staff. The review by the Budget Advisory Committee constitutes what might be termed the first top-level review of the Department's budget as a whole. Its recommendations are transmitted through the Comptroller of the Army to the Chief of Staff and, upon his approval, to the Secretary of the Army. Thereafter, the estimates are reviewed by the Secretary of Defense and, in recent years, jointly with the President's Bureau of the Budget. In December, the Army receives the President's decision, and the Army's estimates as thus amended are included in that five-pound publication entitled, "The Budget of the United States Government." To keep oriented with respect to the Program System, it is at this time that the Army program documents are revised to reflect the President's decisions.

Legislation

By 15 January, the President delivers his annual Budget Message to the Congress, and usually early in February the House Appropriations Committee begins its hearings. It is customary for the Secretary of the Army and the Chief of Staff to appear at the opening of the hearings before the House Appropriations Committee and again at the opening of hearings by the Senate Appropriations Committee. The House Committee hearings are quite detailed and usually last from two to three months. The basis of the hearings is a comparison of three years by budget project: What was done last year, what is being done this year, and the comparison with the request for next year. Senate hearings, on the other hand, are generally fairly brief, utilizing the detailed House hearings and are usually focused upon reaction to changes recommended by the House.

When both Houses have completed their reviews and have passed appropriation bills, resolution of any difference is reached through the Joint Conference Congressional Committee. By that time, the money limitations have been set. The final step is passage of an appropriation law.

At the completion of Congressional hearings in June, or later, the Congress passes the Defense Appropriations Act, which is then sent to the President for signature.

Execution

After the President delivers his budget message to Congress in January, the Army then makes a tentative allocation of dollar amounts to each command, and this distribution is put in the Budget Execution Plan Directive. This is our way of saying to the major commands, "If the Congress gives the President all of the Army money that he is asking for, you can expect to receive this much of it. Now, if you have this much money available to you, give us the details of how you plan to spend it." The details must show not only the purposes for which the money will be spent but also the quarterly time-phasing of such spending. As you can see, the field commands are, at that time, obliged to develop a considerable mass of detail to support and explain their plans for the fiscal year just ahead.

Concurrent with the submission of their Budget Execution Plans to the Department of the Army, the field commands send their program guidance and Budget Execution Plan Directive to their subordinate installations. During April and May, the installations then develop their Budget Execution Plans and submit them to the commands for approval. After reviewing the installation budgets, the field commands hold them until Department of the Army issues its funding program.

It may be noted that these Budget Execution Plans are sent to the Army Staff by 1 April. They are not used in connection with Congressional justification, but are examined by the Staff and form the basis for developing the Army Annual Funding Program. More important, this detailed information is of particular value in the Department of the Army annual hearings before the Office, Secretary of Defense and the Bureau of the Budget to obtain apportionments after the Congress has appropriated the funds.

Once the apportionments have been made by the Bureau of the Budget, the Annual Funding Program is finalized, funds are allocated to operating agencies, and the approved Budget Execution Plans are returned to the field commands. These approved Budget Execution Plans have been adjusted by the Army Staff to reflect funds made available to the Army and are annotated to explain the reasons for the amounts allowed each major command.

When the field commands receive

their funding programs and approved Budget Execution Plans from Department of the Army, they then adjust the installation Budget Execution Plans, as required, and return them together with their funding program and allotments. As to timing, figure 2 represents an ideal—but serves as a target for the accomplishment of various phases of the Budget Execution Cycle.

The Future

Those who have come in contact with the financial side of military operations are well aware of how complicated and confusing it can get. Over the years, concepts change and procedural changes follow. The impact of the first Hoover Commission promoted a change from an organizational to a functional budget. Public Law 216, of 1949, requests a "Cost of Performance Budget." The Army Financial Management Plan, published in 1953, pointed the way to Cost Budgeting. Step by step, progress has been made. In an organization as varied and as wide-spread as the Army, those steps could not be taken precipitously without complete breakdown of the systems in being. It is these change-over periods that are the most difficult; holding what is in being until you can let loose in favor of what is being built, with the man at the end of the line unable to see and grasp the total objective to be sought, as at the moment he is aware of but one small piece.

Budget procedures and methods are and will continue to be greatly influenced by the various other elements involved in the financial management system. It was mentioned previously that the budget is the basic element and originating point for effective financial management. The adoption and extension of the Army Stock Fund and Army Industrial Funds, integrated accounting, financial property accounting, and consumer funding all bear directly upon effective budgeting. Their adoption and proper phasing will help to produce more accurate budgets and help to identify "cost of performance," one of the objectives of the performance budget concept. However, the introduction of these elements of financial management into the management system of the Army also places a responsibility upon the Director of Army Budget for developing effective means of analyzing and evaluating the operation of these various activities. Surely the Congress will become more and more interested in the efficiency of the various operations which are organized under industrial funds. They have already displayed considerable interest in the operation of the Army Stock Fund since both of these devices represent a means of holding under Army control large amounts of appropriation authority. A significant and business-type analysis for the Congress certainly will become an annual requirement.

In June 1957 the Senate passed a bill (S434) which expressed an intent by Congress that at a time determined by the President, appropriations should be stated on an annual accrued expenditure basis. The House Government Operations Committee also submitted to the House in June a bill which with two minor exceptions is identical to the Senate approved measure.

If these measures become law, the Army budgets would request appropriations on an accrued expenditure basis. This new basis would require the Army to determine and request its financing on the basis of the value of goods and services estimated to be received during a specific fiscal year. Thus, regardless of the value of goods and services on order, the Army would be, in effect, limited to a statutory ceiling on what it could accept as deliveries during the fiscal year. Moreover, the Army would also be limited to the amount of goods and services it could order during the year.

The Comptroller has established several groups with representatives from all elements of his office to study the many phases involved in not only converting to an accrued expenditure budget, but further implementing the cost of a performance budget which is a necessary adjunct to accrued expenditures.

• Through the Reserve Forces Act of 1955, the Army has engaged in an intensive campaign to increase its Ready Reserve from 585,000 to 1,682,000 men as soon as possible.

• It requires more than 20,000 weapons of all types, more than 1700 radios and more than 4000 vehicles to give an infantry division the firepower and mobility it needs to sustain combat operations.

• Soldiers on U.S. Army Arctic expeditions, it is generally noted, eat ravenously for ten days or so and then seem to lose their appetites. No medical explanation to account for this has been advanced.

• The Army's Dart is a small deadly antitank missile which can defeat any armor likely to appear on the battlefield and which also can be effective in an assault role.

New Ideas

ADP Used In Load Classification

Reported by: Civil Engineering Department, U.S. Army Engineer Research and Development Laboratories.

Improvement: Computation of Military Vehicles Load Classification Numbers by Automatic Data-processing System Machine.

Background: The U.S. Army has approximately 1000 different types of single and combination military vehicles to carry out its missions. The transportation and mobility for a type field army encompasses roughly 90,000 such military vehicles. The USA Engineer Research and Development Laboratories have the responsibility of determining the load classification number for all these vehicles in accordance with a NATO Standardization Agreement. Bridges are similarly marked, reflecting the load-carrying capacity of the bridges encountered. By visual comparison of these numbers displayed on the vehicles and on the bridges, passage is permitted if the bridge number is equal to or higher than the vehicle number. A study was made of the feasibility of the use of automatic data-processing machines to make the necessary computations to develop the proper load classification number and relieve the engineering personnel of this computation workload.

Before Improvement: Prior to this improvement, the engineering computations associated with determining the proper class numbers were performed by slide rule and desk calculator techniques—long, arduous and repetitive chores. Many man-hours were consumed and the computation files generated became voluminous.

After Improvement: A program was developed to run the data required on ADPS machines and develop the classification numbers. Under the program, vehicle characteristic data, such as axle loads, spacing of axles, width, weight, etc., are entered on vehicle classification data forms by engineering aids. From these data, automatic data processing, punched cards are prepared and submitted together with a prepared program to an ADPS machine for vehicle class determination.

Gains: An unestimatable amount of engineering man-hours is saved for it is now possible to do in seconds what heretofore consumed days, depending upon the complexity of the vehicle. The engineer man-hours formerly needed can now be used elsewhere, more profitably employed.

Procurement and Logistics

New Program

The Air Materiel Command has underway a program to recruit 31 civilian engineers for work in **Quality Control** at ballistic missiles plants and test facilities.

Plans are still being formulated to train at least 10 Air Force engineer officers to take part in the program along with the civilians. "We realize this is not a startling development: using graduate engineers in Quality Control work," said **Col. J. G. Schneider,** AMC's chief of Quality Control. "But this is the first time we have written the requirement that professional engineers *must* be used in certain activities in the Air Force Quality Control program."

Regulus Contract

The Navy announced recently that an additional contract for approximately $26.2 million has been awarded to the **Chance Vought Aircraft** company for continued evaluation and production of the **Regulus II guided-missile.** Implicit in the contract are provisions for spare parts and special support equipment estimated at an additional $7.4 million.

Regulus II is destined to go abroad submarines such as the Navy's first nuclear-powered missile sub, the USS *Halibut.*

New Assault Boat

The Army has awarded **Correct Craft Inc., Pine Castle, Fla.,** a $1 million plus contract to produce the recently standardized plastic assault boat developed by the **U.S. Army Engineer Research and Development Laboratories.**

The lightweight boat, designed primarily for assault crossings of rivers and streams, can carry 15 men and their field equipment. Boat weighs less than 300 pounds.

Lear System Ordered

Specially-designed Lear cockpit instrumentation and gyro references, developed in conjunction with the **Flight Controls Laboratory** of the **Wright Air Development Center,** have been ordered into production by the Air Materiel Command for use in the Air Force's newly-developed integrated panel cockpit display.

The contract award follows 12 months of bench and flight evaluation of the new Lear instruments at Wright-Patterson Air Force Base. Initial production units will be installed in all F-105 and F-106 aircraft. Additional aircraft which may receive the new instrumentation include the F-101, B-58 and T-38.

Bendix Expands

Exclusive world-wide sales rights for a type of receiving equipment known as "FM/FM telemetry" produced by **Epsco, Inc.,** of Boston, Mass., have been granted to the Pacific Division of **Bendix Aviation Corp.**

The sales agreement will provide users of this type of telemetering equipment—which includes ground and airborne electronic systems for transmitting, receiving and recording the performance of missiles—with a single source of complete systems incorporating the latest engineering advancements, the announcement said.

MATS on Industrial Fund

Airlift operations of the **Military Air Transport Service** will be placed on an industrial fund basis in fiscal 1959, and other government departments will reimburse MATS when they use its services, according to President Eisenhower's budget. $75 million has been transferred to the USAF industrial fund in fiscal 1958 to provide working capital for the MATS program.

New System for Eglin

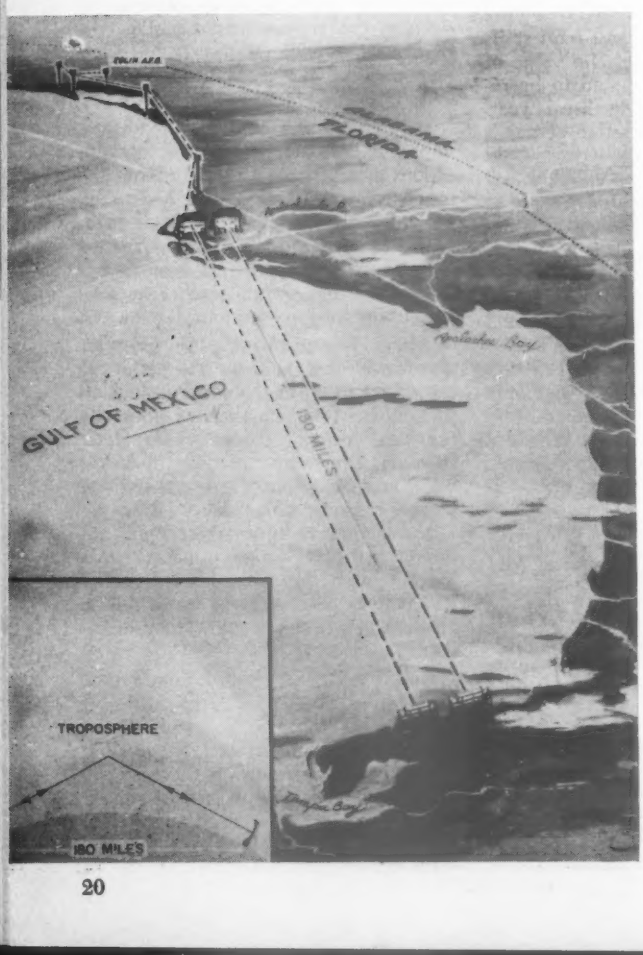
A contract to build a 295-mile communications system for the **Air Force Eglin Gulf Test Range has** been awarded to **Philco Corporation's Government and Industrial Division.**

Outstanding features of this communications project are the 115-mile microwave relay system and the 180-mile, single hop, tropospheric scatter system. This over-the-horizon scatter hop will span the Gulf of Mexico from Cape San Blas to Anclote Point.

The entire project will cost two million dollars and be completed within 18 months.

Largest Contract

A definite contract in excess of $1 million for **RADAN** navigation systems has been awarded to **General Precision Laboratory, Inc., by North American Aviation, Inc.**



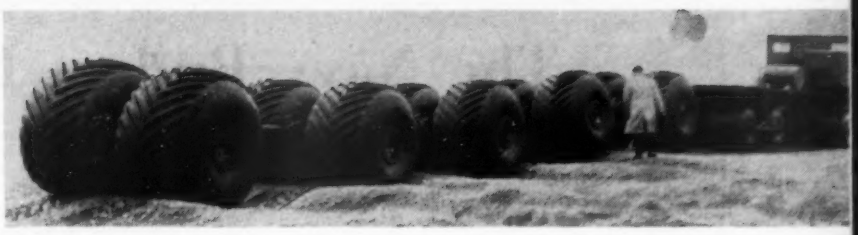
Map shows the 295-mile microwave relay and tropospheric scatter communications system to be built by Philco's G & I Division for the Air Force Eglin Gulf Test Range along the Gulf of Mexico. Inset shows how radio signals are transmitted over the horizon by reflecting the signals off the earth's troposphere.

New Fluid Transport

An unusual new rolling fluid transporter, whose 10 huge rubber tire bags towed by a pillow-tire FWD Teracruzer can transport 5,000 gallons of fuel or other liquids over terrain inaccessible to conventional tank trucks, has been developed for the **Army's Transportation Research and Engineering Command** by the **Four Wheel Drive Auto Company** of Clintonville, Wis.

The new FWD fluid transporter, utilizing containers developed by **Goodyear Tire and Rubber Company,** Akron, O., was unveiled recently for officials of the Army, Navy, Air Force, Marine Corps, and industry.

The transporter developed for the U.S. Army Transportation Corps by FWD has 10 fluid carriers, each 5 feet high, 3½ feet wide, and 500-gallon capacity, mounted in pairs on FWD-developed axle and towing assemblies equipped with filling and emptying and braking systems.



The fluid transporter can be pulled by any vehicle capable of traversing the terrain involved and its overall capacity is limited only by pulling power of the towing vehicle.

New Rules

New rules have been issued explaining Pentagon policy for Government inspection of subcontracted supplies. The effect is to limit such inspections to the following situations: (1) where test reports, inspections, certificates or other statements of quality are unavailable; (2) Inspection is needed to verify test reports, etc.; (3) Shipment is to be made directly from the subcontractor's plant to a DOD using activity; (4) The contract or specification requires that certain inspections be made by a government inspector and that those inspections must be made at the subcontractor's plant.

Computer Cost Down

"The cost of programming a computer to perform data processing is gradually being reduced," said **Richard Canning** of Canning, Sisson and Associates recently.

"Two factors are aiding the reduction of costs," he added. "The first is a definite reduction in the salary level of programmers—the people who set up the details of the computer operations." The other is the development of improved techniques for automatic coding; a process of letting the computer itself do much of the clerical work involved in writing programs.

Provisions Objectionable

Adoption of the proposed revision of the allowable costs provisions of Section 15 of the **Armed Services Procurement Regulation** would discourage industry participation in the defense program and would prove particularly burdensome to small business, the **National Security Industrial Association** said in a letter to **E. Perkins McGuire, Assistant Secretary of Defense (Supply and Logistics)** recently.

The letter is only one example of the opposition of industry to the latest draft of the regulation. Based on this and other comments, the ASPR committee is now trying to determine what, if anything, can be done to save the proposal or whether it will again be necessary to redraft the proposed rules—a job which in the past has taken approximately two years.

M-H Sees Boost In Electronic Sales

Sales of electronic equipment for aircraft and missile control should be one of the stronger segments of the aviation industry throughout 1958, according to **Stephen F. Keating,** vice president in charge of **Minneapolis-Honeywell's Military Products Group.**

"The role of electronic control equipment for aircraft and missiles has been steadily increasing during the past few years," Keating said, "and may account for about 23 per cent in 1958 of total monies spent for aircraft and missiles, compared to 20 per cent in 1957 and 17 per cent in 1956."

Supply Center Opens

According to the Camp Pendleton paper, the largest supply **Self Service Center** in the **Marine Corps** will open there on April 1.

Designed to speed up and simplify requisition procedures, the center is now in the planning and building stage. Expected to be completed in February, it will be the supply source for over 200 unit customers.

ATA Outlines Military Traffic Proposal

The Air Transport Association recently outlined a broad program aimed at channeling more military traffic to commercial carriers while simultaneously building up a large civil reserve air fleet.

Strange Order

Albuquerque—The Aerodynamics department at **Sandia Lab** recently faced a critical problem in maintaining constant temperatures in its research wind tunnel, since air in the storage tanks, released from 300 pounds pressure, dropped in temperature from 100 degrees Fahrenheit to 60 degrees below zero during a typical 30-second test.

The department manager remembered a previous instance when empty tin cans were packed inside a storage tank. It seems that the cans retain enough heat to warm the air as it is released from the tank. So the Supply people at Sandia received what is probably the strangest requisition on record—an order for a carload of empty dog food cans. The cans worked out fine, the Aerodynamics man said.

White Sands Construction

At least 52 major construction projects totaling $37 million will be completed at **White Sands Proving Ground** during the next two years, according to the **Army Corps of Engineers.**

The vast expansion program, biggest in WSPG history, includes six projects nearing completion, 31 fiscal year 1958 projects to be completed later this year, and at least 14 items already partially approved by Washington for fiscal year 1959.

Biggest item in the '59 program will be more than $3½ million worth of range instrumentation facilities.

Tracerlab Bid

S. S. Auchincloss, president of Tracerlab, has announced that the company will make a strong bid for its share of "That part of the 1958 budget which will be spent on applications of nuclear energy both in the **Department of Defense** and in other agencies. Increased recognition on the part of the U.S. government and industry of the ability of isotopes to do things better, faster, and cheaper, coupled with the need to accelerate our program for utilization of isotopes.

The Navy Budget Process

by Rear Admiral G. F. Beardsley,
USN, Assistant Comptroller
Director of Budget and Reports

It is the intention of this article to explain the basic elements required to obtain a general understanding of the Navy budget and budgetary process. It is not intended to be detailed or technical but instead a readable and simplified description to allow interested individuals to look behind the scenes and see how the Navy arrives at an operable budget.

THE United States Navy is one of the largest organizations in the world. Its assets are about as large as the combined assets of the one hundred largest industrial corporations in the United States. The Navy spends about $10 billion per year. In fact, judged by any criteria, the Navy today is big business and like any other big business the importance of budget in management cannot be overlooked.

It is a maxim that no department of government, no bureau, and no program manager is ever entirely satisfied with the amount of funds made available to carry out a year's work. This is understandable since it shows the enthusiasm with which programs are undertaken and executed. It is a fact of life, however, that funds are limited. In peacetime, the availability of funds—the appropriations made by Congress—is the limiting factor in determining the size of the fleet, the number of ships, planes and missiles to be constructed, the extent of the research and development effort, the number of Marine Divisions, and the degree of readiness in hundreds of other programs essential to a balanced and adequate defense program.

Many factors other than "requirements" come to bear in determining the size of each year's budget. Of these, perhaps the chief factor is National Fiscal Policy. The magnitude of defense expenditures raises serious questions which must be resolved each year. How much can the Nation afford to spend for defense without endangering the economy of the country? Likewise, what should be the level of taxation to support the government's programs? Questions of this nature have engaged the attention of top personnel throughout the government and the decisions made with respect to them have been strong factors in determining the size of each year's defense budget.

Probably the first question that one would ask in trying to understand the formulation of the Navy budget would be, "How does budgeting get started for any fiscal year?" or "Where does the cycle start?"

Let us begin with the fall of each year when the Secretary of Defense can be expected to issue approved force levels and personnel strengths for the fiscal year beginning approximately 20 months in the future. These guidelines are based upon recommendations received from:

a. The Joint Chiefs of Staff as to the desired capability of the Navy and the desired increment towards achievement of the strategic objectives included in the Joint Strategic Objectives Plan.

b. Policy decisions made by the National Security Council.

In addition to the above, the Secretary of Defense may include guidance concerning the following:

Budget Limitations
Operation and Maintenance Funds
Procurement Policies
Military Construction
Reserve Components
Research and Development
Military Assistance
Proposed Legislation

Based upon the Secretary of Defense's guidelines, the Secretary of the Navy then outlines his policies in regard to the new budget to the Chief of Naval Operations and the Commandant of the Marine Corps. At this point in the cycle, the Secretary of the Navy directs the Chief of Naval Operations to proceed with the development of the Department of the Navy Annual Program Objectives. This action takes place approximately *18 months* prior to the commencement of the pertinent fiscal year. The Annual Program Objectives are intended to reflect reasonably attainable goals based upon technical capabilities and a rough balance among the various types of naval warfare which are planned for accomplishment during a particular fiscal year. In other words, these Program Objectives contain the annual increment of major programs which can be expected to be accomplished during that year.

Once the Chief of Naval Operations has been directed to proceed with the development of the Program Objectives, he promulgates the approved force levels, personnel strengths, assumptions, guidelines and other Departmental guidance to his military program planners.

Based on the program guidance provided by the Chief of Naval Operations, information on programs is collected, coordinated and submitted by Program Sponsors and Coordinators to the Assistant Chief of Naval Operations (General Planning). As soon as the program information has been received, a draft of the Program Objectives is prepared. The formulating of the Program Objectives is not merely one of collecting information, rather it is a matter of adjusting and tailoring programs, balancing them with other programs to insure that the overall objective will be met. The adjusting process continues until an acceptable draft is written.

These Program Objectives, as initially prepared, and as amended, are roughly priced, budget category-wise, by the Assistant Comptroller, Director of Budget and Reports, in order to determine whether the total cost is within a range considered to be reasonably attainable.

The document and its price-tag are then submitted to the Chief of Naval Operations Advisory Board for review and possible revision. The Chief of Naval Operations Advisory Board (commonly known as CAB) is composed of senior officers of the Navy and Marine Corps and is headed by the Vice Chief of Naval Operations. During the course of its deliberations, the CAB carefully scrutinizes each program, its military objectives and its cost implications. This process generally involves some retailoring and is the final readjustment before submission to the Chief of Naval Operations. In considering the cost factor, the Board usually recommends that the Program Objectives cost out slightly above any budget guidance

DEVELOPMENT OF THE NAVY BUDGET
DEPARTMENT OF THE NAVY
PRESIDENT
BUREAU OF THE BUDGET
SECRETARY OF DEFENSE
JOINT CHIEFS OF STAFF
SECRETARY OF THE NAVY
CHIEF OF NAVAL OPERATIONS
NAVY COMPTROLLER
BUREAUS, OFFICES & HQ, USMC
PROMULGATES OVERALL POLICIES AND GUIDELINES GOVERNING BUDGET PREPARATION; DIRECTS MILITARY DEPARTMENTS TO PREPARE BUDGETARY PLANS AND POLICIES
DEVELOP JOINT OVERALL STRATEGIC CONCEPTS AND FORCE LEVELS
OUTLINES NAVY POLICIES, DIRECTS PREPARATION OF ANNUAL PROGRAM OBJECTIVES DEC 15
*REVIEWS AND APPROVES PROGRAM OBJECTIVES JAN 25
PREPARES PROGRAM OBJECTIVES FOR SECNAV JAN 10-21
PROMULGATES APPROVED PROGRAM OBJECTIVES FEB 1
ASSISTS CNO IN DEVELOPMENT OF PROGRAM OBJECTIVES
ISSUES "CALL FOR BUDGET ESTIMATES" BASED ON APPROVED PROGRAM OBJECTIVES FEB 1
FIELD ACTIVITIES PROVIDE REPORTS AND ESTIMATES OF THEIR REQUIREMENTS
PREPARE & SUBMIT ESTIMATES BASED ON APPROVED PROGRAM OBJECTIVES FEB 1 - JUL 2
*NAVCOMPT PRESENTS SUMMARY OF BUDGET ESTIMATES BY COST CATEGORY JUL 10
REVIEWS BUDGET SUBMISSION & PREPARES SUMMARY BUDGET BY COST CATEGORY JUL 2-9
*HOLDS HEARINGS WITH BUREAUS, OFFICES & HDQRS, MARINE CORPS JUL 10 - AUG 22
BUDGET MARKUP AND RECOMMENDATIONS AUG 23 - SEP 3
EXAMINATION OF MARKUP, MILITARY IMPLICATIONS, & ADJUSTMENT OF DIFFERENCES - SEP 4-17
ASTSECDEF, COMPTROLLER, HOLDS HEARINGS & RECOMMENDS BUDGET TO SECDEF
SECDEF REVIEWS AND TRANSMITS ESTIMATES TO BUREAU OF THE BUDGET
RECEIVES AND RESOLVES RECLAMA DIFFERENCES (CAB ATTENDS) SEP 21
APPROVES AND TRANSMITS RESOLVED NAVY BUDGET OCT 1
REVIEWS STATUS OF BUDGET MARKUP AND RECOMMENDS ADJUSTMENTS SEP 18 (CAB)
PROVIDES INSTRUCTIONS REGARDING FORM & CONTENT OF NAVAL ESTIMATES & JUSTIFICATIONS IN SUPPORT OF THE PRESIDENT'S BUDGET JAN 9
COORDINATES NAVY BUDGET AND JUSTIFICATIONS FOR PRESENTATION TO CONGRESS
PREPARE FINAL ESTIMATES AND JUSTIFICATIONS JAN 18
REVIEWS ESTIMATES AND JUSTIFICATIONS AND DETERMINES NAVY BUDGET
INCORPORATES NAVY BUDGET INTO PRESIDENT'S BUDGET DOCUMENT
NOTES: CAB - Indicates "CNO ADVISORY BOARD" (OPNAV INST 5420.28)
ALL DATES ARE APPROXIMATE.
*UNDER SECNAV, ASTSECNAVS, CNO & CMC ATTEND.
#ATTENDED BY APPROPRIATION AND PROGRAM SPONSORS FROM CNO AND CMC.

in order to provide some leeway in subsequent planning.

The revised draft is then submitted to the Chief of Naval Operations for his consideration. The Commandant of the Marine Corps reviews, in collaboration with the Chief of Naval Operations, those matters which concern the Marine Corps.

Final Step

The next and final step is the review of the document by the Secretary of the Navy. This is done in a formal meeting attended by his senior military and civilian advisors, including the Under Secretary, all the Assistant Secretaries, the Chief of Naval Operations, and the Commandant of the Marine Corps. When approved, it is distributed throughout the Navy Department.

Detailed budget formulation begins to take place within the Navy upon issuance of the Program Objectives and the call for submission of budget estimates issued by the Comptroller of the Navy. Normally, these two basic and determinate documents are issued by 1 February of each year, or 17 months before the start of the fiscal year in question.

Upon receipt of the Program Objectives, Navy bureaus, offices and Headquarters, U.S. Marine Corps, who eventually receive funds appropriated, assume the responsibility for preparing budget estimates in consonance with the guidelines as cast in the Program Objectives in order to meet the budget submission date to the Navy Comptroller, which is normally 2 July.

Upon receipt of these detailed budget estimates, they are comprehensively reviewed by the Navy Comptroller. Hearings are held with officials of the bureaus, offices and Headquarters, U.S. Marine Corps, to examine their budget estimates, their feasibility, pricing, and the integration and coordination of their requirements with other Navy requirements. Based upon this review, the Navy Comptroller recommends changes to the budget as submitted. The CNO Advisory Board meets once again and reviews the estimates submitted by the bureaus, offices, and the Marine Corps, the amount recommended by the Comptroller of the Navy, and makes such program adjustments or recommendations within an overall total budget figure deemed appropriate to obtain a properly balanced Navy. These recommendations are presented to the Chief of Naval Operations for his decision to secure the most effective Navy.

The budget, with the recommendations of the Chief of Naval Operations and the Commandant of the Marine Corps, is then presented in detail to the Secretary of the Navy for review. During this presentation, the Bureau Chiefs, the Commandant of the Marine Corps, and others interested in the various programs are afforded a final opportunity to request reconsideration of adjustments which have been made in their budget estimates. Usually some adjustments are made at this time, but these adjustments, although important to a particular program, do not greatly affect the overall Navy budget. Of utmost importance is the fact that in these processes, Navy's top management is informed as to the degree of funding of Navy and Marine Corps requirements.

After this review by the Secretary of the Navy, the budget is submitted to the Secretary of Defense. The Secretary of Defense, in joint meetings with the Director of the Budget and their budget representatives, review the Navy budget estimates as well as those of other services.

The budgetary review by the Secretary of Defense and the Bureau of the Budget results in further adjustments. Upon completion of this process the budget is submitted to the President. After the budget is approved by the President, he then includes it in his annual budget message to the Congress. A flow chart depicting the development of the Navy Budget as presented herein may be found at the end of this article.

At this point in the budget process, the review of the budget shifts from the Executive Branch of the Government to the Legislation. Probably the best known area of budget review is the congressional review with the resultant Appropriation Bill. The Appropriation Bill as passed by the Congress generally does not materially change the budget as submitted. The adjustments that are made, however, as well as the wishes of the Appropriation Committees reflected in the Committees' report on the Appropriation Bill, are implemented in the execution of the budget after the passage of the Appropriation Bill.

It might be well to explain here that the Navy Budget includes 21 appropriations compared to 8 for the Air Force and 11 for the Army. Although the Navy appropriation structure is well suited for the Departmental Organization, it does add to the complexity of budget management.

Apportionment

Once the funds have been made available through congressional appropriation, the bureaus and offices request apportionment of funds for the ensuing fiscal year. After hearings and review by the Comptroller of the Navy and further review by the Assistant Secretary of Defense (Comptroller), the Bureau of the Budget, in accordance with existing law, makes the final determination and approves the amount of funds to be apportioned.

The issuance of the Program Objectives with the concurrent call for estimates to the bureaus, offices and the Marine Corps is the first formal entry of the Navy Comptroller in the budget process. It is the responsibility of the Assistant Comptroller, Director of Budget and Reports, to:

a. Organize and administer matters relating to budget reports and statistics.

b. Establish, develop and supervise the execution of general principles, policies, and procedures governing the preparation and administration of the Navy Budget.

c. Supervise and direct the preparation, analysis, and coordination and review of the budget estimates of the Department of the Navy and the presentation of the budget to the Secretary of Defense, the Bureau of the Budget, and the Congress.

d. Allocate funds to bureaus and offices of the Department of the Navy and administer apportionments requested by the Comptroller and approved by the Secretary of Defense and the Bureau of the Budget.

e. Continuously review rates of obligations and expenditures of appropriated funds and develop budget control as an effective instrument of management.

f. Plan and prepare statistical analyses to provide budgetary and fiscal information for management control and determination of broad administrative policy.

Although there are many other areas of responsibility, the foregoing indicate a good framework of the major interests.

With the passage of the Appropriation Bill, before any of the funds may be used, the funds first must be apportioned. Since considerable time has elapsed since the budget was initially prepared, the financial plan of action of the appropriation administrators is reviewed. This review endeavors to insure that the programs approved by the Department of Defense, the President and the Congress are implemented, that funds are not diverted for other less urgent purposes, that it is feasible at that time to use the funds for the purpose intended, and to make such adjustments to reflect changes which have occurred since the budget was initially prepared. The Comptroller of the Navy approves the apportionment and forwards the request to the Secretary of Defense for his review and then to the Bureau of the Budget.

Upon final approval by the Bureau of the Budget of the final apportionment, these funds are then allocated in whole or in part to the bureaus, offices and the Marine Corps with such qualifications concerning their use as may be pertinent. These allocations are usually meaningful subdivisions of the appropriation such as budget activities. The limitations may be for such purposes as the amount which may be spent for Public Information. If a particular program, though approved by all concerned, cannot use the funds appropriated at this time, the funds may not be apportioned or, if apportioned, may not be allocated. An example of such a situation would be the failure to complete developmental tests of an item scheduled for procurement. Bureaus, offices and the Marine Corps administering the appropriations further allocate those funds to the forces, stations and programs over which they have financial and management responsibility.

Keeping Tab

In order to insure that the dollars are spent for the purposes intended, there are various interested offices which keep informed of progress being made. In the first instance is the bureau, office or the Marine Corps which insures that the funds are utilized within the limits of their allocations. Reports are submitted to the Comptroller of the Navy and to the Secretary of Defense relative thereto. The bureaus also have inspection offices, the Department of the Navy has the Navy Inspector General, the Comptroller of the Navy has the audit program and cost inspection. The military program planners in the Office of the Chief of Naval Operations are interested in having the tools to implement their areas of responsibility.

In conclusion, it can be said that when the budget receives final approval of Congress, it has been worked on for about 18 to 20 months. During this period and at each reviewing step, all officials involved strive to insure that the budget is adequate for the Navy to carry out its assigned mission in the defense of the country and that the greatest amount of naval value per dollar is obtained. In view of the rigorous attention devoted to it, the budget as eventually submitted to Congress is certainly a minimum budget and one that cannot be reduced without serious effect upon well-considered programs essential to our national security. Finally, after funds are appropriated, our methods of checks and review continue to insure that we obtain maximum naval effectiveness for the dollars spent.

The Safety Link In the Defense Chain

by E. A. Clark
Safety Director
Ordnance Weapons Command

WE ARE NO longer fighting wars with sling-shots or bows-and-arrows; but it may be open to question as to whether or not the design and evolution of our "safety shield" has kept pace with the new complex technology. Comes the day of test and we cannot afford any fumbling, inefficiency, breakdowns or faltering due to inadequate previous safety controls or staffing. This is no longer a day when we have time for ex post facto analyses of accidents in adolescent detail; we must so plan, direct and engineer our safety programs that such things no longer happen. When the bell rings, let us have that complete logistical support that includes an adequate previous program of safety that helps oil the machinery of delivery and effectiveness.

We can no longer afford passivity, mediocrity or the river of dollars which may be wasted due to a 19th Century concept of safety in a 20th Century fast-moving national defense picture.

There is no need to review here any itemized list of fire-safety-health requirements or deficiencies to bring us abruptly to the fact that something or somebody we took for granted *just might not be there* when urgently needed. While there is still time, let us protect and safeguard our investment in plant, in equipment, in weapons and in trained people; and let us cease losing $10 where selective advance investment of $1 might save it.

No day passes but that somewhere something happens which should alert us. This sad record includes structures that burn, property lost, and equipment and employees' health damaged because someone neglected his duty or saw it too narrowly. Talk about the loss of a horseshoe nail being responsible for the loss of a battle! Sometimes we may question whether some units are doing any better today.

There seems to be no profit, either, in listing the occupational health-safety exposures connected with various missions, which are increasing almost as fast as we can write them down. We are apparently immune to people slowly dying, becoming inefficient, and retiring due to lack of adequate safety engineering for protection. What can wake us up?

What awakens one man, may not another. Perhaps we need a whole battery of alarm clocks differently designed for different people. Surely no one in a responsible position *wants* to be ill-advised or vulnerable. Obviously, there should be no question of responsibility, for it is spelled out (clearly, it is assumed) in organization papers and directives. Safety most surely should be an area of concern if such affects our defense posture.

This may be a time when we might question horse-and-buggy thinking in an era of jet movement and nuclear activity. Let us take a clear look at the caliber of staff safety assistance we are getting for our money. Let us also review the old indices used to measure the relative value of "degree" of safety, and consider whether they are currently meaningful. Let us recognize any impediments that may have been blocking the road toward the goal we all want. Let us stop wastefulness on-the-job and off-the-job.

The safety of our entire industrial national powerhouse, of our brainpower, of our materials, of our processes, and of all the relating, concomitant factors can affect the safety of our country.

• The Army Signal Corps is striving to perfect lighter weight equipment which is durable, dependable, of longer range, and highly resistant to enemy electronic counter-measures.

• San Diego Fleet Sonar School used surplus electrical cables and miscellaneous electrical fittings worth $3,000 from other training activities to install a sonar trainer.

• Chincoteague Naval Air Station hired temporary employees to fill vacancies in critical work areas. The measure saved the Station $1,335 by eliminating overtime.

• Great Lakes Naval Hospital saved $7,253 on food preparation by obtaining surplus butter at $.04 per pound and surplus cheese at $.02 per pound.

The Scotty Sam Story

A Thrifty Scot Guides Lone Star Ordnance Plant's Cost-conscious Program

by Joseph F. Gigliotti

LONE Star Ordnance Plant is one of the numerous ammunition-producing activities under command of Brigadier Joseph M. Colby, Commanding General of the Ordnance Ammunition Command, Joliet, Illinois. The installation at Texarkana, Texas has been under the command of Lt. Col. John E. Harrison since June 1953.

One of the jobs of the Lone Star Ordnance Plant is to see that not one cent of the money put into its effort is wasted. With this thought in mind management initiated a Plant Economy Program. This Plant Economy Program affects every employee from the equipment operator who could ruin a machine worth thousands of dollars down to the office worker who throws away a half-used pencil.

Pete Tripp, KOSY disc jockey is flanked by Lone Star Ordnance Plant's Scotty Sam and Bonnie during one of their *"shows."*

To publicize this Cost-conscious Program, a fictitious character called Scotty Sam was created by Joseph Gigliotti. Scotty Sam symbolizes all the attributes of the proverbial Scot in thrift, economy and saving. Scotty is constantly and aggressively shown throughout the areas and offices of the Plant.

The intent was to associate the thrifty Scot with the mission of cost consciousness in that the very mention of his name would earmark the topic as that of all-out economy. In order that this "association" could be implicitly realized, the first phase of the Lone Star Ordnance Plant Economy Program consisted of a series of identity contests. The *Powder Horn*, the Plant newspaper, carried Scotty's first message: "Hello folks, this is your real Scotty Sam! This is the first of a series of contests we're running in this here paper and here's all you have to do to win a $25.00 United States Savings Bond— Be the first person to identify the man who is this week 'posing' as me. Ask your co-worker—ask your helper—ask your inspector or even your boss; one of them is Scotty Sam. Who knows, but one of the persons you ask may very well be the one, and although he will not tell you so at that moment, you will find out in the next issue of the *Powder Horn*, that you were the first person as ask Mr. ————: 'Are you Scotty Sam.' Simple isn't it? So, start askin': Are *you* Scotty Sam."

It was through the media of these timely contests that Scotty Sam's name very rapidly became part of everyone's conversation. His name was now more and more aggressively associated with all-out economy. Via caricatures that appeared in the Plant newspaper and multicolored posters displayed throughout the installation his name was

linked with cost consciousness.

As the Program gained momentum, it was realized that in order to more realistically portray the mission of Scotty Sam, a feminine angle was needed—thus Bonnie was created. With each issue of the *Powder Horn* both Scotty and Bonnie brought to all the employees an appropriate message in the current Plant Economy Program.

Then on the front page of the Plant's bimonthly appeared "I. M. A. Klunker." His role was directly opposite that protrayed by Scotty and Bonnie. He symbolized the qualities that employees should not develop. That is, Klunker is a composite picture of all the inadequacies in relation to lack of cost consciousness.

Along with the whole scheme of effectively putting across the Plant's program, a huge display was prepared and conspicuously installed in the lobby of the Administration Building. The huge, multicolored sign not only served as a reminder to the employees but also was in full view of "outside taxpayers" who visited the building, informing *them* that Lone Star Ordnance Plant is economy minded and cost conscious. "Improper care rendered these useless . . . are you responsible?" is boldly inscribed in the middle of the 8 ft. by 12 ft. sign. Hung on the sign surrounding these words are actual articles—from a typewriter to a pencil sharpener—which are tangible items made useless through improper care. Other articles are a pair of safety shoes with holes cut in the tops; a safety flashlight which was used as a mallet; a telephone which was smashed when dropped from a desk; wire snips used to cut excessively large wire; scissors used as a screw driver.

Management constantly sought every opportunity to remind employees to reduce waste and cut costs. It requested all workers for suggestions, however petty, on ways and means of saving taxpayers dollars. "Just place your idea in a suggestion box today and follow rules such as these: *1.* Avoid improper use and carelessness of equipment. *2.* Do not waste materials by inattention or rough and careless handling. *3.* Do not disregard the potential salvage of rejected inert materials. *4.* Do not withdraw greater quantities of supplies than is reasonably required. *5.* Always obtain from supplies their greatest possible use. *6.* Conserve labor by avoiding habitual tardiness and absenteeism without just cause and notification and *7.* Always do the task assigned you so that duplicate labor cost will not be necessary because someone else must do your job."

The Cost-conscious Program lassie, Bonnie, contacts another worker on what he's doing to perform his job more economically.

"We shall force the United States to spend itself into destruction." Scotty made this reference in the Plant newspaper and continued: "These words are the words of Lenin, father of Russian Communism, and stand a very good chance of becoming true, unless we, as Americans and employees of Lone Star Ordnance Plant, make every effort to ward off the oncoming attack of waste. We can avoid a last-ditch stand by taking action now to cut costs."

Radio was used to spread the story of Scotty Sam. Scotty's first appearance on the airways was made when Pete Tripp, local station KOSY disc jockey, announced: "From time to time we have dedicated songs to employees of Lone Star Ordnance Plant who tune in on us daily while returning home from work. Today we would like to dedicate a portion of our show to Scotty Sam, not an employee, but a character who is playing a vital role in the operations at the plant. Scotty is a thrifty Scotsman, fictitious, of course, who symbolizes the economy program which to date has made amazing progress in saving dollars for us taxpayers. We understand that the latest activity Scotty is engaged in is awarding trophies for the best monthly letter written to him by an employee in regard to what *he* is doing to perform *his* job more economically."

In order to keep the Economy Program fresh and full of action, the idea of bringing Scotty and Bonnie to life was realized and the two embarked on another successful phase, *i.e.*, contacting employees on all jobs and asking the question: "What are *you* doing to perform *your* job more economically?" Photos of these interviews were publicized in each issue of the *Powder Horn*.

Another milestone in the life of Lone Star Ordnance Plant's Scotty Sam was the memorable day he took Bonnie as his bride. The wedding ceremony and reception were highly publicized (via the *Powder Horn*) and the Program was off to another successful phase.

Does Army Management Differ from Big Business?

by General Charles L. Bolte, USA, Ret'd.
Special Assistant to the Chairman of the Board
ACF Industries, Incorporated

MANY INDIVIDUALS in business, industry, and commerce who have not been closely associated with the armed services have a mistaken belief that the military man's sole function is to issue combat orders and fight battles . . . that the fields of finance, industrial production, procurement, storage, and distribution are not properly within his province or experience.

Actually, within the armed services, this issue has long, though fortunately in steadily lessening degree, existed to a certain extent between the "line" and "staff." The unfortunate result has been a constant tendency to advocate complete separation of the "business" functions from the "tactical" or "combat operational" functions. This, for the Army at least, would be an unfortunate reversion to the situation of more than half a century ago, when the soldier had to accept willy-nilly what the Bureaus procured.

On the other side of the coin, Army, Navy and Air Force leaders alike sometimes have tended to rate their management problems as both larger and more complicated than those of private industry. This, too, is a fallacy, although an understandable one: a military staff dealing with hundreds of thousands of troops and many hundreds of millions of dollars worth of property is not apt to be much impressed by even the largest and most diversified business complex.

Military Myopia

For a time I was, myself, guilty of this type of military myopia. As Commander in Chief of the U.S. Army, Europe, in 1953, I was, of course, responsible for several hundred thousand soldiers, members of soldiers' families and civilian employees . . . for billions of dollars worth of plant equipment and supplies . . . and for annual "off-shore" purchases on the order of a billion dollars. Nobody could have convinced me—then—that the management problems of any business executive anywhere could stand comparison with mine, in either complexity or scope.

In that, I was wrong, as I learned soon after joining ACF Industries, Incorporated. ACF is not unusually large, by American business standards. It has some 17,000 employees, 22 plants in 19 States, numerous offices across the country, and seven product divisions. Its net sales were $295 million in fiscal 1957, no trifling amount, but still perceptibly less than the annual business done by Post Exchanges under my command in Europe.

But ACF Industries is diversified—and this diversification results in organization problems that are remarkably similar to the military's. ACF makes and sells railroad cars, nuclear reactors, missile components, automotive fuel systems, a wide variety of valves and fittings, aircraft components, computers, electronic flight simulators, and military shells and fuses. Those are merely a few selected items.

Philosophy

I have stressed ACF's diversification not only because it is similar to that of a military command, but also because it is responsible for ACF's organization and management procedures, a fundamental subject of this commentary. ACF defines its management philosophy as *Decentralized Management with Centralized Control.* This phrase derives from the firm's strict divisional structure and, although it seems ambiguous at first reading, means literally what it says: normal *management* prerogatives are exercised at the division level and therefore decentralized . . . the necessary *control* is exercised by the *centralized* home office. The military parallel is obvious.

ACF put this philosophy into practice when it reorganized in June 1955. At that time, distinct product divisions—originally six, and now seven—were established, and all production activities were allocated among them. Each division is headed by its own president with his own management team. Each president is responsible for all phases of his division's operation, including production, engineering, marketing, research and development, and cost control.

The division presidents report directly to J. F. Clark, the president of ACF. They are, in Mr. Clark's words, "autonomous in their operations within the bounds of reasonable and proper controls." I will return to those controls later on.

Parallel to the divisional structure—neither over or under, but advisory or complementary to it—are five staff vice-presidencies. Each consists of a vice president and a group of supporting specialists. The areas assigned to these five offices are Finance, Corporate Affairs, Industrial and Public Relations, Manufacturing and Engineering, and Marketing. The staff vice presidents also report directly to Mr. Clark. Their duties are primarily advisory or consultative.

The Similarity

I mentioned previously that, because of its diversification, ACF's organization problems are "remarkably similar" to those of the military. ACF's organization itself is, if anything, even more similar. I felt, rather than fully recognized this at first, and one morning I skeletonized the organizations of the Department of the Army and of ACF in adjacent columns. The parallelism of the two sets of entries is remarkable.

The reason for the parallelism is obvious: similar problems produce similar solutions. Nevertheless, recognition of these similarities was reassuring to me. I know of no better way to make an old soldier feel at home than to surround him with civil-

ian counterparts of the military authorities with which he is familiar.

The Big Difference

Similarity of *structure*, however, is not necessarily accompanied entirely by similarity of *operation*, and, as a matter of fact, ACF operates in what I can only describe as a somewhat unmilitary way. The differences are most apparent and most important in the techniques of controls. In a phrase: ACF *persuades* where the military *orders*.

To some extent, this distinction is of course true of almost any comparison of a civilian with a military operation—although I know of companies, the impersonality of whose directives would shock the toughest General. The *way* ACF exercises, or tries to exercise, control through persuasion, however, is unusual even by the most modern business standards.

That brings me back to the phrase to which I promised to return: *Decentralized Management with Centralized Control.*

The heart of ACF's home-office control over its semiautonomous divisions is a management technique called *Programming*. As an industrial practice in its modern form *Programming* is only a few years old although, as will be shown, it has a long-standing precedent in military practice. *Programming* can be defined as the application of scientific controls to the entire gamut of an industrial complex, from research through production and marketing to future growth.

Program by Persuasion

ACF's procedure is even more definitive than that. It not only programs—which is still somewhat novel in industry—but it programs by persuasion. At least theoretically, programming could be applied by authoritarian directive, by give-and-take discussion or by some compromise between the two.

Programming has three major elements: the establishment of *objectives;* the delineation of *programs* designed to accomplish the objectives, and the comparison of achievement with goals by means of periodic *progress reports*. ACF *objectives* and *programs* are developed in detail for the approaching fiscal year and in summary for four additional years. *Progress reports* are compiled monthly.

(I'm sure you are already beginning to feel at home with *Programming*. Certainly, these steps are not new to any military commander. Even the nomenclature of the third one—"Progress Reports"—is a commonly used military phrase.)

The objectives are the foundation of the system. Each division's objectives are originated by it, which is a form of decentralization at the very inception of the technique. They are grouped into standardized categories —Sales, Production, Research and Development, Financial, and Personnel and Industrial Relations—and cover all things the division hopes to and believes it can accomplish in the specified ensuing period.

An example of a Sales objective might be: To increase our share of the market from X to Y percent. A Production objective might be worded: Completion of the automation of Blank Department by July 15.

The preliminary objectives are sent to the home office and there reviewed and evaluated by the staff vice presidents and by the director of programming. Needless to say, the home office and the division do not always see eye to eye**—home-office staff has both specialized knowledge and an overall view that the best informed division president could not possibly acquire. It is at this point that discussion first enters the control picture. Home-office and division executives sit down together and try to resolve their differences. In a stalemate, the home office of necessity has the last word; staff vice presidents, like the Deputy and Assistant Chiefs of Staff to whom I compare them in my chart, can "pull rank" if absolutely necessary. The necessity seldom arises. Every effort is made to advise and persuade rather than to command. Control is exercised by joint participation rather than by admonition.

Basically the Same

If I have given any impression that I consider ACF management techniques differ *basically* from those of the military, other than the "persuasion *vs.* orders," that is not my meaning. Basically, both contain the *essentials* of: mission, estimate of the situation, decision, detailed assignment of operation, feasibility from logistical standpoint, control organization and communication arrangement—*i.e.*, the familiar paragraphs 1, 2, 3, 4, 5 military order.

As pointed out by General Dawes during World War I, however, there is a basic difference between the *fundamental purposes* of a business and a military organization. The mission of the first, as in a railroad for example, is to make money and serve the public, without depreciating or destroying but, rather, improving and expanding the plant or facility. That of the second is to deter, or win, a war, even if in the winning the physical plant facility or means is damaged or destroyed in the successful attainment of victory.

It is in the *performance* of these diverse missions that the parallelisms between military and civilian organizations and procedures are noticeable.

** Here again is a military parallel! Shades of the Pentagon and "the field"!

About the Author

General Charles L. Bolte, U.S. Army (Ret.), was Vice Chief of Staff of the U.S. Army from October 1953, until his retirement on April 30, 1955. He previously served as Commander in Chief of the U.S. Army, Europe.

A graduate of Armour Institute of Technology, General Bolte received a Regular Army commission in 1917. With the 58th Infantry, Fourth Division, he took part in the Aisne-Marne, St. Mihiel, and Meuse-Argonne offensives in World War I. His peacetime assignments in the 1920's and 1930's included instructing at the Infantry School, attendance at the Command and General Staff School, and graduation from and instructing at the Army War College.

In World War II, General Bolte served, successively, as: Chief of Staff of the United States Forces in the United Kingdom, first Chief of Staff of the European Theater of Operations, assistant commander of the 91st Infantry Division, and Commanding General of the 69th Infantry Division. In July 1944, he was assigned command of the 34th Infantry Division then in combat in Italy, and led it through the rupture of the Gothic Line, the winter campaign in the Apennines, the capture of Bologna, the surrender of the Axis forces in Italy and the subsequent occupation.

General Bolte was awarded the Legion of Merit in 1944 and both the Silver Star and the Distinguished Service Medal in 1945. He received a Purple Heart for wounds sustained in World War I.

Rebuttal

Let's Keep the Comptroller

by Eldon E. Sweezy

Special Assistant to the Office of the Commanding Officer Diamond Ordnance Fuze Laboratories

THE article "Let's Get Rid of the Comptroller" by Colonel Robert E. Lee Masters, in a past issue of ARMED FORCES MANAGEMENT, pleads eloquently the role of the comptroller in the management family of an organization. In doing so, however, some basic concepts of management have been distorted or overlooked. In addition, some new concepts are introduced for which there is no valid body of substantiating experience.

Three assumptions are implicit in Colonel Masters' presentation: (1) A top executive need have only one principal staff advisor. (2) Financial considerations and other management considerations are so interdependent that one cannot be soundly considered without the other. (3) The forecasting and evaluating functions of an executive may be delegated. If these are granted, there are no further grounds upon which to debate the establishment of a comptroller. We must examine these three assumptions in some detail, however, to see if they are supported by either logic or experience.

The position of infallibility that would be forced upon the comptroller by his role as the sole source of staff advice on management of the program of an organization, is an enviable one. It would make it unnecessary for him to justify his decisions, his points of view, his premises or the adequacy of his facts. Colonel Masters indicates that such a role requires a personal immunity from influences other than the good of the enterprise as a whole. Even though we assume the catholic competence of the comptroller, we are still confronted with the need to judge the altruism of his motivations. Let us grant, for the moment, that he alone is solely motivated by the desire to assist the operating official in achieving what the operating official needs to accomplish; that he alone has no desire to accomplish anything for himself, either in terms of prestige or other rewards. We still find the working executive solely dependent upon, and subject to, the frailities and weaknesses of one person and guided and directed in his principal decisions by the conclusions of only one mind. The complexity of problems normally confronting the manager of any enterprise are such that there are always legitimate differences of opinion on the course of action that can be taken. The choice between alternate courses is uniquely the prerogative of the line executive himself. Organizationally this responsibility cannot be assigned to a staff official.

No Cure-all

In our desire to make maximum use of the taxpayer's funds given us to carry out the public business, we have recognized that it is important that we be better financial managers. Some would have us, like a child with a new toy, conclude that this new way of doing something is the only way and it can do all things for all men. The fallacy of this view needs no detailing here.

The provision of staff advisors to an executive is normally made necessary when the demands upon him exceed the limitations of his span of time, span of knowledge and span of energy. In other words, when the problems demand more time or a broader scope of knowledge than he possesses it is legitimate to add staff officials to provide the specialized knowledge or to reduce the demands upon his time and energy. Line executives in government operations can rarely handle the specialized problems of knowledge in the budgetary and accounting areas. The addition of staff advisors in these areas is therefore a legitimate extension of the staff principle.

The role of the comptroller described by Colonel Masters, however, presupposes the existence of another limitation upon the span of control of the operating executive—a limitation on the executive's span of judgment. A careful search of the literature of management reveals no record of this limitation as a factor in determining organization structure. For limitations of this type there is no remedy in staff-line organization. The remedy is the removal of line officials who are not competent to exercise judgment upon the diverse factors affecting the ability of their organization to fulfill its objectives. It should never be the role of a staff official to exercise judgment in lieu of the judgment of the operating official.

The origins of the words "coordination" and "coordinate" (as used in mapping terrain) are the same. One of the basic premises mapping techniques, whether by triangulation or by photogrammetic methods, is the need for two independently recorded observations. It is foolhardy to assess the exact nature of the terrain by using one set of observations made by one set of eyes from one vantage point. There must always be another in order to check for possible error in reading or distortion in observation.

The same is true in the field of psychological measurement when there must be a subjective factor introduced into the appraisal of results. In this field it is proved that the data have greater reliability as the number of independent pooled judgments reflected in the data increases. In the research laboratory where precision of measurement is of significance the readings taken on the instruments are independently verified and all variation outside of specified limits is the subject of detailed investigation. Why then is it only in the field of management, a disciplined are, that sole responsibility, sole judgment and sole sources of advice become valid, dependable aids to the executive?

Disturbing

There is another disturbing aspect to Colonel Master's article in that he attributes only to the comptroller an insatiable appetite for fact. There is an implied assumption that only those in comptrollerships deal with problems on the basis of fact. The rest of us deal in opinion and subjective judgment. Besides this obvious defect, there is an implicit assumption that the factors for consideration in reaching management decisions are always factual and are subject to precise identification. Anyone who has for any substantial time occupied a "seat of decision" in a dynamic organization is well aware of the validity of Chester Barnard's statement that the executive must accept the inevitability of the unknown and the unknowable.

It would appear then that there can be more wrong with the Comptroller than his title. Let us not, however, make sweeping assumptions concerning the indispensibility or the dispensibility of comptrollership. It would appear far wiser to accept the fact that this staff method also has its limitations. We should proceed to gain the maximum benefits from effective control of our financial resources. We dare not assume that differences of opinion are destructive or that only through unanimity of advice can an operating executive achieve his objectives. Let us recognize the valid role that differences of opinion play.

Personnel Preview

Unification Battle Brews

A full dress battle is brewing over the current series of proposals to further unify the **Army, Navy and Air Force**—with the chances that there will be more heat than action in the second session of the 85th Congress.

Admiral Arleigh A. Burke has described the proposals to unify the armed forces under a single chief of staff as laying "the foundation for disaster." In making his statement, Admiral Burke joined forces with **General Maxwell B. Taylor,** Army chief of staff.

Recent statements indicate the Congress would like to find a way to put an end to the long delays in decision-making resulting from inter-service bickering, usually at top level. The big question won't be the goal but rather the ways of meeting it.

Army Consolidation

Following similar actions by three other Army areas, eight military districts in the **First Army area** are being consolidated into two **U.S. Army Corps (Research),** the Army announced recently.

First Army's consolidation plan is geared after the new setup already in effect in the Second, Fifth and part of the Fourth Army areas. It is designed to improve the supervision and support of the Army Reserve and effect economies in personnel, funds, and facilities.

First BOMARC Training Wing Activated

The first Bomarc training unit was activated at **Eglin Air Force Base,** Florida, in mid-January.

The unit, designated the **4751st Air** Defense Missile Wing, will develop and conduct a training program **for** Bomarc missile units. The current training program is designed to have Bomarc missile crews ready for Bomarc operational squadrons when the missile sites are completed.

TV Teaching Boon

Closed circuit color television is proving a boon at **Walter Reed Army Medical Center,** one of the world's great research, teaching and treatment enclaves.

No longer is it necessary for a student to peer around the backs of operating room personnel at long distance to try to see what in many cases only the surgeon can see with exactitude. The operating room theater is a thing of the past at Walter Reed, where the TV system has been operational for its first experimental year. Students are able to view an operation in minute detail from any of 170 viewing locations throughout the center; or they may see it in an auditorium, projected on a 6x4-foot screen.

Recent Addition

The recent addition of 50 new instructors to the **Philco Corporation** staff has swelled the faculty of the **U.S. Army Ordnance Guided Missile School** at Huntsville, Ala. to 325 persons.

Ten nationally known corporations supply the school with 166 civilian instructors on a contract basis to teach the operation and maintenance of parts and components for the Army's rapidly increasing armory of new weapons.

Companies in the program, of which the Philco group is the largest, are Douglas Aircraft, Associated Aero Science Laboratories, Western Electric, Firestone Tire and Rubber, Gilfillan Bros., Radio Corporation of America, Chrysler Corp., North American Aviation and the Martin Company.

Total strength of the school is nearing the 2,000 mark. It is the Army's only activity devoted exclusively to guided missile training, a spokesman said.

New Film

The Army has announced a new training film, titled "The Pentomic Army," is being made available at Signal Corps central and major film exchanges in early February.

The new film explains the origin, structure, weapons, and future of the Pentomic Army. It places emphasis on recent advances and developments in firepower, mobility, and communications. In addition, the film gives detailed information on the reorganization of divisions and the newly-developed missile commands.

Hercules Battalion

The Department of the Army has announced that the first **Nike Hercules** missile battalion will begin training soon at **Fort Bliss, Texas.**

The Hercules program will involve conversion of Nike Ajax units to Hercules battalions and the activation of new units. Much greater training activity is scheduled for Fort Bliss. The input of students to be trained on the Hercules may result in a peak load of some 10,000 students at the Air Defense School. This compares with a student load of about 3,000 a year ago.

SAC Reups

General Thomas S. Power, SAC Commander, was presented with a symbolic check for $37 million in a brief ceremony at SAC headquarters recently.

Reason was the more than 2500 first term airmen who decided to make a career of the Air Force. The sum was the estimated tax dollars saved by not having to train replacements.

Data Processing In Aircraft Maintenance

by Manuel Lewis, Treasurer
Flight Enterprises, Inc.

Massive workstands take aircraft specialists 48 feet above the ground to work on the tail surfaces of the Air Force C-124.

In the fields of mass production, and standardization of materials and models, mechanized procedures for the recording and evaluation of data are relatively simple. But nowhere does the challenge of the use of electronic equipment meet sterner tests than in the aircraft maintenance industry.

ALL businesses are faced with the reality of balancing rising costs with tighter and tighter budget controls. It is no longer economically sound to know that costs were "so much" and that production took "so many hours." Forward-looking management wants to know "what" the costs were, and "why" the hours were needed.

Analysis of these important facts is a *must* in the aircraft maintenance industry.

The United States Government, with the aid of the civilian contractors performing the work, has evolved a two-pronged system for the overhaul and modification of all types of aircraft, from the small single-seated liaison plane to the huge 4-engined cargo transports, and even the mighty jet bombers. These systems are called "Drop-in Maintenance" and "Cycle Maintenance."

The different types simply denote why and when certain work must be performed. They would be analogous to the car owner taking his car to the garage once a year or every 5,000 miles driven (cycle or periodic check-ups), and the "drop-in" work required for poor engine performance, accidents, etc.

Flight Enterprises, Inc. has been overhauling, modifying, and maintaining aircraft for many years. In the governmental phase of this field, it became apparent several years ago that methods of cost control and production control would have to be streamlined and mechanized to enable the military agencies to evaluate not only the work accomplished but to program the future scheduling of aircraft into our facility.

Most of our work has been on the C-118's (military version of the DC-6 carrying 60 passengers) and the C-124's (the "Flying Boxcar") for Military Air Transport Service. MATS commitments for carrying passengers and cargoes all over the world demanded a maintenance system that would keep the airplanes on the ground for a minimum length of time and yet assure the necessary thoroughness of inspection and maintenance required for maximum safety in flight.

What work had to be performed on each aircraft? Why did certain areas require more productive hours on one aircraft than on others? How often did certain accessories, components and engines require overhaul? How thorough should each inspection and overhaul be? The answers to these and many other questions were needed by management to assist in the development of an efficient but safe aircraft overhaul procedure. A need for electronic data processing equipment developed which brought about the installation of a Remington Rand Univac 60 unit.

Production control procedures were set up to process all operations on each aircraft. The different types of maintenance, "Drop-in" and "Cycle" (the latter has now evolved into the MATS/SAM Military Air Transport Service Systematic Aircraft Maintenance concept), were controlled by the use of a numbering sequence chart for the work orders. All work to be performed was detailed on each work order and controlled by a project number. Finally each operation or type of skill was coded into the work order.

Each aircraft in for "Drop-in" maintenance is totally different from the next one insofar as the specific

(Continued page 42)

Research and Development

New Member

Dr. Louis N. Ridenour, assistant general manager of Lockheed Missile Systems division for research and development, has been named to the **National Advisory Committee for Aeronautics'** newly created **Committee on Space Technology, Dr. James H. Doolittle,** NACA chairman, announced recently.

The Committee was established last November when the NACA executive committee decided that the year-end advances by the Russians in space technology suggested "a fresh look" at the whole problem. The space technology committee, under the chairmanship of Dr. Guyford Stever of Massachusetts Institute of Technology, will hold its first meeting Feb. 13 at the NACA headquarters in Washington.

Advanced Weapon Research

Support is building up for the shifting of responsibility for advanced weapons research to the **National Advisory Committee for Aeronautics** or an **Atomic Energy Commission**-type organization. The support is coming not only from Capitol Hill but from the military services themselves, with the odds favoring an expansion of NACA activities.

Military thinking of those who would take the new agency out of the Pentagon is that NACA already has a respected leadership, an organization with needed skills, and has learned to work with the Army, Navy and Air Force. They argue that to create a new organization within the Office of Secretary of Defense to handle advanced weapon research (now under study) would even further delay the long and difficult job of obtaining "concurrences" and slow-down decision making even further.

Two Experts to Polaris

To accelerate the Navy program for bringing the **Polaris** missile into **fleet** use, two ship-design specialists have been added to the **Special Projects** group working on that program, the Navy has announced.

Captain James M. Farrin, USN, Commander of the Philadelphia Naval Shipyard, has assumed duties as special assistant for ship design and production and **Captain Henry A. Arnold,** USN, repair superintendent at the Pearl Harbor Naval Shipyard has been designated his assistant for ship production. The two officers will concentrate on solution of design problems involved in the construction of nuclear-powered submarines capable of launching Polaris. Their work will be coordinated with the rapidly advancing development work on the Polaris missile to the end that production of the missile and construction of the new submarines will progress simultaneously.

Ocean Studied

Probing down to nearly two miles beneath the surface of the **Mediterranean,** Navy scientists completed a series of 26 dives in the Piccard bathyscaphe, **The Trieste,** off the coast of **Naples** late last year, according to information just released.

Sponsored by the **Office of Naval Research,** this particular series of dives emphasized a study of the field of sound in the ocean growing out of the Navy's great interest in underwater acoustics in submarine warfare. Investigations of the biology, geology, and physics of the ocean depths also were conducted in an attempt to identify sources of ocean sounds and to determine the sound transmission qualities of the ocean and the bottom.

Aviation Gas Improves

Aviation gasoline improves when stored in pits carved out of ice in the tunnel which the **U.S. Army Corps of Engineers** has driven into the Arctic Icecap to a distance of nearly 1200 feet, the Army has revealed.

The fuel, which evaporates rapidly and takes on impurities under normal climactic conditions, can be stored indefinitely in the pits under the icecap, according to scientists. They have determined that the fuel not only retains all of its properties but is even improved after an extended storage period.

Rocket Engines

New "super-efficient" rocket engines are being developed by **Thiokol Chemical Corp.** using a solid high **energy** fuel to be produced by **Callery Chemical Co.,** according to a joint announcement by the two firms.

"We feel that the greater energy possible from this type of fuel will help us to achieve a rocket engine of greatly improved performance with lower weight and greater power," said J. W. Crosby, president of Thiokol. "Preliminary studies with the new fuel have been encouraging."

Air Force Studying R&D

An Ad Hoc Research and Development Committee, informally known as the **Stever Committee,** is studying research and development activities within the Air Force.

Dr. H. Guyford Stever, former Chief Scientist of the U.S. Air Force, will head the committee, which was created in November to evaluate Air Force organization, functions, policies and procedures as they relate to research and development and make recommendations which could lead to increased effectiveness.

Missile Named

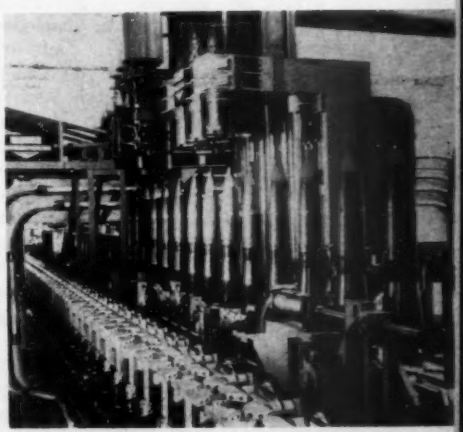
The Army's new solid propellant missile has been named the **Pershing, Secretary of the Army Wilber M. Brucker** announced recently. Named after General John J. Pershing, the new missile will soon be under development and will succeed the Redstone. While retaining the **Redstone's** mobility, field, worthiness and accuracy, Pershing will be smaller, lighter, and even more mobile. The new missile will provide the Army a more versatile and flexible weapon.

Scientist Named

Dr. Lloyd G. Mundie has been appointed by the Systems division of **Bendix Aviation Corp.** to direct a research program in the development of infrared projects.

Automated Shell-Filling

As part of a large standby armament program, the **U.S. Army Ordnance Department** has contracted with **American Machine & Foundry Co.** to build a fully automated shell-filling line for the **Joliet (Ill.) Arsenal.** Designed by AMF's Mechanics Research Department in Chicago to handle either **75** or **90 mm** shells, (see photo), the system represents a "first" in the ordnance field.



Delegate— Don't Deputize

by Colonel Frank Kowalski, Jr.

THE trend in recent years to deputize is giving our military organizations the appearance of well-groomed Zulu ladies. Deputies, chiefs of staff, assistants, and executive officers are being piled one upon another in ever increasing numbers forming elongated command columns. This expanding interposition seems to be serving the same questionable purpose as the rings about the necks of the Zulus—the heads of both are being forced as high as possible above their bodies. If this neck stretching continues in the Army, there can be only one outcome—organizational strangulation.

I don't suppose there was ever a period in the Army when an officer was considered to have any standing unless he had an executive. Today, this is not enough. To be recognized, a man must also have a deputy, preferably two. This of course applies not only to large organizations, but also to sub-elements and staff agencies. A new kind of organization principle seems to have evolved in the Army which says, "Don't delegate—appoint a deputy to coordinate."

Let us take a look for example at an Army headquarters. In addition to the Commanding General, there is a of Staff, Deputy Chief of Staff for Operations, Deputy Chief of Staff for Administration, a kind of Deputy for programming and sometimes a Deputy Chief of Staff (Comptroller). All this before we get out of the front office. Following this array come the Assistant Chiefs of Staff, each of whom have a Deputy Assistant Chief of Staff. In the sections the Assistant Chief of Staff and the Deputy Assistant Chief of Staff are assisted by a section executive officer and on occasion by an assistant executive officer. A few years ago, as a Colonel in an Army headquarters, I was eight layers below the Army Commander. At that time I had been a Colonel for eight years. I don't mean to imply by this that the number 8 has any significance. I might say however, that only six of the layers above me were occupied by Colonels. This is a fantastic build up of layer upon layer of supervisors, checkers and assistant commanders. An Army headquarters is only a convenient example for me to cite. Headquarters above the Armies installations are loaded with similar layers of deputies and assistants.

How did we get this way? Much of it just happened. Certainly there seems to be a universal feeling among men in responsible positions in the Army that they need an alter ego to help them with their jobs. Also as a matter of modern styling a deputy, an assistant or an executive officer is as necessary to a military organization as the tailfins on our automobiles. No organization or agency today could afford to be without either. There is little logic to this situation but there are several good reasons for its existence.

Probably the most important factor that generates deputies is the tendency of all organizations to centralize. This tendency is particularly strong in the Army where all headquarters are in the grip of an inane fear that a subordinate echelon may make a mistake. In order to minimize mistakes, and thus protect higher headquarters, the actions of all subordinates are closely supervised. The commander obviously cannot do this alone. Accordingly a powerful coordinating general staff and a multitude of special and technical staff officers are assembled to help him command. But as the reins of control are pulled ever tighter into headquarters the staff becomes more and more involved in the operations of subordinate units. It takes on continuously expanding functions which require even more people. A vicious cycle is born. The tendency to centralize gives rise to coordinating and control staffs, which generate expanding functions, which require more people who create more functions, etc. Unhappily, subordinates in the field, being humans that they are, continue to make mistakes. And so more things require "coordinating" at headquarters. The assistant chiefs of staff already blessed with executive officers appoint deputies to help "coordinate" the coordinators. And the chief of staff buried under an avalanche of paper is finally rescued by one or two deputy chiefs of staff who now help to coordinate the coordinators of coordinators. In a similar fashion and for the same reasons sub-elements of organizations spawn executive officers and deputies in a fantastic 1 to 1 to 1 span of control.

The tendency to centralize generates this pseudo need for deputies, but it is the personnel situation in the Army today that encourages and facilitates their use. In this connection there are two kinds of deputies, military and civilian, and both are found in the senior ranks and grades.

In the case of the military, inflation in rank, particularly in the grade of Colonel, has provided an over-abundance of ready-made deputies. These officers finding themselves near retirement at the age of fifty are "underfoot" to the younger Generals. They are shunted from one assignment to another. Gradually they gravitate to old friends who try to take care of them. Unfortunately there are not enough jobs for inspectors to go around. Yet most of these officers have fine reputations and so it is natural that places should be found for them as deputies and assistants in some organization which can, or is willing to absorb them. Under these circumstances, with the Army strongly inclined towards centralization with the individual believing he needs an alter ego to help him, and with a large pool of experienced senior officers readily available for the job, the heads of organizations are continuously being pushed farther and farther away from their organizational structures.

In the case of civilian employees the deputy position is created essentially to permit a suitable grade structure for a good man who otherwise would be held down by inflexible civil service regulations. If this is the only way that we can secure a proper grade for a deserving employee then we have a problem, but this is no excuse for having a deputy. The need for continuity is often cited as justification for a civilian deputy. I can't agree that this is a justification. If the staff,

agency or activity is properly organized, with authority and responsibility delegated to qualified subordinates, military or civilian, it is difficult for me to visualize a situation where the new head of an organization could not accept the considered recommendations of his subordinates as readily as the advice of a deputy who should have considered the recommendations of these subordinates in the first place. In my opinion there is no need for a civilian deputy on the basis that he will provide continuity. This can be provided effectively by qualified, properly assigned subordinates and I can't believe that their recommendations get any better by being filtered through a civilian deputy. Whether my contention is correct or not, the ease with which a civilian deputy can be interposed into our organizations is a great boon to those who are bent on elongating our organizational necks.

In distinct contrast American corporations abhor deputies, executives and other forms of alter ego. It is unlikely that a president of a civilian enterprise would place anyone between himself and his line commanders, the vice-presidents. Nor would a Division vice-president appoint a deputy or an executive officer or an assistant between himself and his plant managers. General Electric and Esso absolutely prohibit the use of "assistants to." In large corporations the chain of command is clear and direct from president to vice-president, to plant manager. The products to be manufactured and the services to be performed are clearly identified; functions are defined and responsibility and authority delegated to accountable individuals. In General Electric, Radio Corporation of America and Corning Glass Works for example, there are a total of eight layers of supervision between the president and the worker on the bench. What is more important, these organizations are continuously striving to reduce the layers of supervision.

I cite the above not because I think business and industry are better organized than we are in the Army. I cite it because I am convinced that with regard to decentralization there is much we can learn from American big business. In any case as I look at the unabating urge to deputize in the Army, it is most difficult for me to justify our incongruous span of control on the basis of any known principles of organization. The facts are clear. Our inclination to build layer upon layer of supervisors is costly in personnel, creates bottlenecks, and is generally an inefficient way to organize.

As the delegation of decision-making authority to responsible subordinates is the essence of decentralization so the creation of deputies, assistants and executive officers is the antithesis of delegation and serves to promote centralization.

What can we do about all this? We must somehow return to fundamental principles of organization—principles which have been accepted for generations. Basically we must learn to delegate rather than deputize. I would suggest that in any organization, activity or staff the responsible individual should:

(1) Differentiate his task into functions.

(2) Combine similar functions to facilitate operations.

(3) Assign responsibility to one man to perform each function or group of similar functions.

(4) Delegate authority to the latter sufficient to permit him to carry out his tasks.

(5) Hold this man directly accountable (not through a deputy executive or assistant).

(6) Let the man do his job.

These principles of organization are sound. The first three are usually intelligently developed and efficiently executed. Beginning with the fourth principle, fear gains ascendency. We hold back authority. We appoint deputies, assistants and executive officers to help us control and coordinate our subordinates. And finally instead of letting the responsible subordinate do his job, we perch on his shoulder and supervise.

Somehow we must develop the courage to believe in our subordinates, learn to trust them and most important, have confidence in our own ability to motivate them. Then and only then will we as leaders influence the behavior of our subordinates. This leadership however, is not made easier or more effective by interposing a command column of alter egos between ourselves and those we would lead.

● The job of the combat engineers is to keep friendly forces moving forward by overcoming natural or man-made obstacles, to assist them in defense by construction of barriers and obstacles, and to join them when the chips are down in the time-honored role of rifleman.

● Army lawyers must annually handle thousands of claims, both for and against the government and many of them extremely complex, which arise at all levels from post, camp, and station up to that of the Department of the Army.

New Ideas

New Training Plan for Meat Cutting

Reported by: Fourth U.S. Army (Fort Hood, Texas).

Improvement: Practical instruction in meat cutting moved from school area to Central Meat Cutting Plant.

Command Program Affected: Training.

Background: The facility available to the meat cutting phase of the cooks course was inadequate for the number of students currently being trained. In addition to crowded work space was added the increased storage and transportation of highly perishable meat items, particularly during the hot season. This further necessitated considerable paperwork loads upon already overtaxed clerical personnel.

Before Improvement: Prior to the changeover of training to the Post Central Meat Cutting facility these conditions existed.

1. Student work area in that facility so crowded as to present a safety hazard during practical exercises.
2. This crowding also prevented instructors from observing errors and correcting them as they occurred.
3. A minimum of six issue and turn-in slips were necessary for the procurement of carcass meats and return of processed product to Central Meat Cutting Plant. These required a total of 4 man-hours weekly for typing, submission, processing and pick up.
4. Approximately eight hours of critical truck time was required to transport meat, pans and bone cans back and forth between the school area and the Post Central Meat Cutting Plant.

After Improvement: These are the benefits of the changeover:

1. Work space for student training is more than ample.
2. Instructors control of class may be measured by quality of test and examination papers submitted since changeover.
3. Meat for practical exercises is unlimited.
4. Refrigeration of perishable meats is no longer a problem.
5. Paperwork for procurement is not necessary as product does not leave meat plant until issued.
6. Critical transportation is related for other pressing needs. Eight to 10 truck-miles and 24 man-hours saved weekly.

Gains: 1,248 man-hours per year, plus increased student proficiency.

Before—Financial Control documents were stored permanently on tops of employees' desks, chairs and tops of file cabinets.

What the hard, efficient use of a "broom" can do to improve an office operation was proved recently by the Navy Aviation Supply Office, Philadelphia, Pa., in their

Operation Clean-up

DURING their recent "Operation Clean-up" the Navy's Aviation Supply Office moved over five and one-half freight carloads of records—destroying two and one-half carloads of these, shipping two others to NRMC Mechanicsburg for inactive storage, and transferring one freight carload to one of the warehouses at the activity where less costly filing facilities were available.

The clean-up campaign, swept off by Rear Admiral John W. Crumpacker, Navy Supply Corps, ASO's Commanding Officer, provided reams of benefits including cash savings of better than $64,000, easing of the critical space situation, "face-lifting" in the office area profile and a decided improvement in employee morale.

The clean-up was in three phases:

1. A general division-wide policing of desks, tops of file cabinets, and other visible areas.

2. A "Spring housecleaning" of an accumulation of documents, office equipment and supplies, in an effort to improve working areas, locate "lost" correspondence, and return e cess equipment to stock.

3. A records disposal operation i cluding the moving of files to NRM Mechanicsburg, the disposal of othe and the removal of still others to op shelf storage area in another buildin

ASO's Financial Control Divisi was designated target area for t initiation of Phase I of the drive. T division employees voluntarily swe out their own area including the r moval of material that had been sto on the tops of file cabinets, realign and policing the tops of desks, tabl and other visible areas, and, in ge eral, changing the appearance of t office from a cluttered cubical to executive suite.

This division-wide policing led t more efficient use of office space, i proved paperwork operations an better employee morale.

The "Spring housecleaning," Phase II of the three-pronged driv was conducted simultaneously in a divisions during a two-week perio probed all accessible areas for ma terials, equipment, and publication no longer required, and retired th publications or returned the equipme to stock.

Among the results was the discar ing of 2,291 cu. ft. of material—equa to 1 cu. ft. per employee—101 fi cabinets were made available and 1 desks and five typewriters were amon the thousands of items returned t stock.

The items returned to stock suc as staplers, stamp pads, thousands o reusable forms, etc. not only provide immediate reuse but also reduced th amount of funds which would hav been expended in order to replac these articles.

The cost alone of maintaining th 101 active file cabinets amounts t $14,140 annually based on record management experts' estimates of $14 per year per 4-drawer cabinet. I addition, ASO's critical space proble was alleviated, the purchase of new cabinets was postponed, and some o the growing pains were remedied.

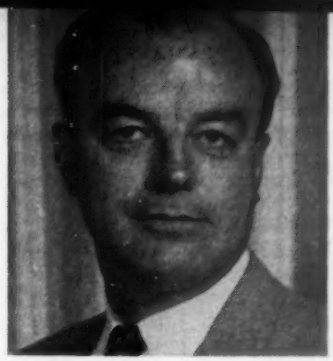
Most of the "paper" profits were a result of the third phase of the clean-up—the records disposal operation. Among the many changes were these:

Change over to a single file folde for procurement requisitions permit use of open shelf filing which will re lease 498 4-drawer and 51 3-drawe legal size file cabinets for redistribu tion. Using cost figures of $55 for each 4-drawer cabinet and $40 for each 3-drawer cabinet, savings of $29,430 is realized.

Procurement files were retired o disposed of in accordance with Bu-

(Continued page 45)

After—View of the Financial Control division area after Operation Clean-up.



What Quality Control Means In Military Management Rating

by Don W. Dunn

Deputy Chief, Management Analysis Division
Comptroller, Headquarters Air Research and Development Command

The management rating system in ARDC covers sixty-two control areas which provide top management with indicators of the effectiveness of operations, primarily in the management of resources. The levels of performance are portrayed monthly in statistical tables and graphic illustrations in the *ARDC Performance Evaluation* publication, as well as in Command Management Control Briefings —conferences of top-level executives. The system is based on the examination of routine, official reports submitted to command headquarters. Effectiveness is determined by analyzing the statistics from these reports.

The ARDC Management Control System has been in effect for three years. Up to the beginning of this year, comments regarding the system were continually heard along the following lines: "It's unfair to compare my operation with any other," "You can't rate my organization against a common Command goal," "Consider my peculiar mission, the location of my organization, the difference in availability of materiel," etc.

We in the Management Analysis Division of the Comptroller believed then that these differences did in fact exist. To us it appeared that the AF Missile Development Center, located in the New Mexico desert and concentrating on missiles, had to be significantly different from the Air Force Cambridge Research Center, located in the metropolitan area of Boston and exploring the field of electronics. We believed that such differences existed among all organizations of the Command, because each of them was doing work in an entirely different field of research and development.

To ascertain if a Center of this command was in fact different from another, the statistics covering the control areas in our system were carefully examined. It was found that the range of performance in each item differed notably between one Center and another.

Figure 1 represents an analysis of experience in the utilization of test support aircraft by the Centers of this command. Two-thirds of the monthly experience reported (representing a percentage of utilization of Test aircraft) are included within the length of the vertical line. The arrow identifies the average (arithmetic mean) utilization. The heavy horizontal line represents a command rate computed as an average of performances at all Centers.

By removing the vertical lines representing the performance at four centers **Figure 2** shows that RADC (Rome Air Development Center) experienced a utilization rate above the command average throughout the period measured. AFFTC (Air Force Flight Test Center) and AFAC (Air Force Armament Center), on the other hand, experienced a utilization rate below the Command average at all times. Assuming that the utilization rate of 4% at AFFTC represents for that organization an above average utilization of test aircraft, it is obvious that this Center would have difficulty in ever reaching the Command average. This situation was found to exist in the majority of control items in our system.

It is important to know that the various rates examined were experienced during one and one-half years of operation of the Management Control System. Because of this we had to assume

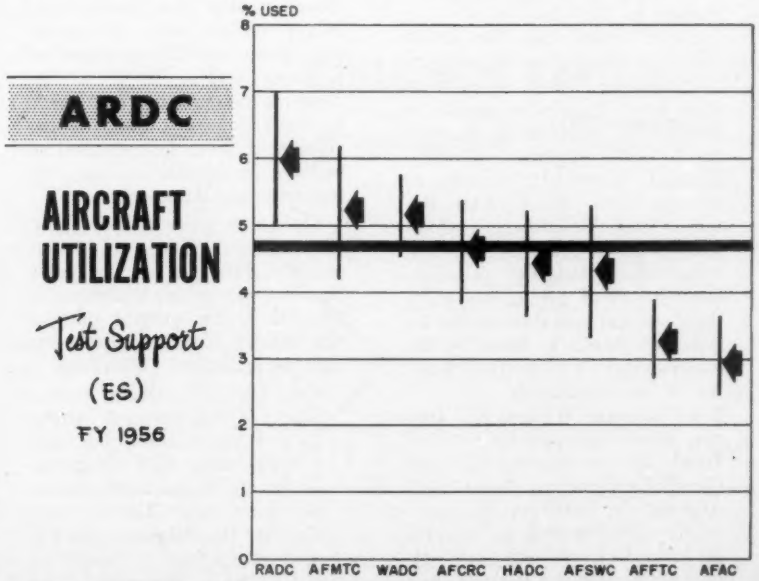


FIGURE 1 THE LENGTH OF THE VERTICAL LINE REPRESENTS THE RANGE OF THE UTILIZATION OF TEST AIRCRAFT DURING THE PERIOD MEASURED.

that responsible officials were giving these areas close attention during this period and were trying to eliminate undesirable factors.

Not only were we concerned with the physical differences among our Centers—we were also worried about bringing unimportant statistical fluctuations to the attention of management. When one is traveling by automobile with a desire to maintain a speed of 60mph, a reduction in speed to fifty-nine or an increase to sixty-one miles per hour obviously is nothing to get excited about. It was important that we keep this factor in mind in determining which areas required attention.

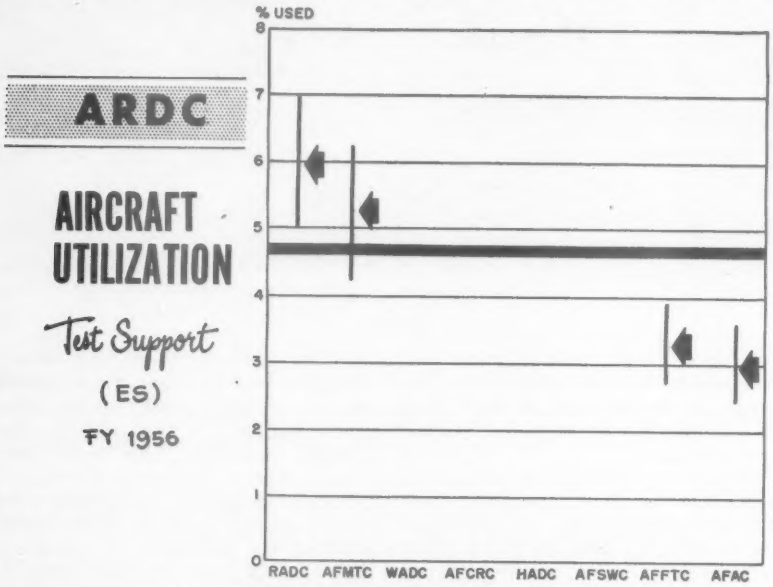


FIGURE 2 ILLUSTRATING THE INABILITY OF CERTAIN ARDC CENTERS TO MEET A COMMON COMMAND RATE.

Requirement

Even more important than perfecting the statistical technique was the requirement to insure that the areas examined in the system were the strategic ones which would reflect the management situation of the command. To meet this requirement the Commander of ARDC divided the management responsibilities of the command into principal functional components and assigned a value of importance to each component. The size and importance of the areas were established by assigning percentage values to each of them, as follows:

Funding Activities ..25%	Operations ...15%
Personnel ...20%	Administration 5%
Materiel 20%	Manpower ... 5%
Installations .10%	
	Total ...100%

Following this identification of the principal areas and their importance by the Commander, a total number of points for the entire system was set at 20,000. Responsible officials in charge of the functional areas were then instructed to divide and subdivide their component responsiblities

About the Author

A senior civil servant with extensive management experience in government service—granted the USAF meritorious civilian service award for contribution to the effective management of the United States Air Forces in Europe in 1953-54.

Dunn writes that the article "Quality Control in a Military Management Rating System" results from experience gained in the implementation of management control systems in USAFE (United States Air Forces in Europe) and ARDC (Air Research and Development Command). Since these control systems were designed primarily for the use of top management their success was due to the interest displayed in them by the commanders of these two major Air Force commands.

Lt General William H. Tunner, former Commander in Chief USAF in Europe, now Deputy Chief of Operations, Hq. USAF, directed the initiation of a command rating system in USAFE in July 1953. His use and support of it were the basic reasons for its success.

Brigadier General Chester W. Cecil, Jr., now Director of Management Analysis, Hq. USAF, was the Comptroller of the United States Air Forces in Europe during this same period. It was under his immediate direction that the management rating system was developed. His grasp of the potential of a rating system for a tactical organization and his continuing personal interest during its development were instrumental in making the system produce vital management information.

Since much use of the experience of the officers who were actively engaged in the early development of this technique in USAFE is an integral part of this article, it is essential that they be identified. They are:

Col. Harry A. Olson, former Chief of Management Analysis and Ass't Comptroller, Hq. USAFE, now Ass't Comptroller for Field and International Relations Hq. USAF; and **Col. H. W. Oglesby,** now Executive to the Comptroller, Hq. USAF, formerly Chief of Management Analysis, Hq. USAFE.

Using the experience gained in a tactical command, the Management Analysis Division of ARDC created a rating system tailored to the peculiar requirements of the Air Research and Development Command.

General Thomas S. Power, former Commander of ARDC and now Commander of SAC, encouraged and supported the development of the rating system from the start. **Major General John W. Sessums, Jr.,** the Vice Commander of ARDC, uses this technique at the regular conferences of Vice Commanders of this Command.

Credit for a large share in the development of the new techniques and ideas for the ARDC rating system must be given to **Lt. Col. James J. Randazzo,** currently Chief of Management Analysis at ARDC and a long-time expert in the field of Air Force management; and to **Major William F. Boore,** now professor of metallurgy at Washington State College, Pullman, Washington.

into specific measurable items within their operations. Since the number of items within a functional area was sometimes high, the use of points facilitated the determination by the functional chief of the importance of each. These items were assigned point values to signify their degree of importance in the total functional area. For example, the responsible official for the Personnel functional area had available 4,000 points (20% of 20,000) to distribute among component Personnel responsibilities. He assigned 360 points to "civilian manning," 300 points to "airmen on-the-job-training," and 160 points to "civilian positions audit."

Total point values of all items within a functional area could not exceed the total points allocated, nor could any individual item receive less than 100 points or more than 20% of the total assigned to each functional area.

Following the identification of the items which should be in the system it was necessary for the Management Analysis Division to develop a method of examining the statistics which would take into consideration the differences in mission among the Centers and improve the reliability of statistically identifying problems.

To meet these two objectives we had to develop a technique which would indicate how well a manager was using the resources at his disposal and which would also provide better than an even chance of determining the reasons for excellent or sub-normal performance. We decided to experiment with the statistical quality control technique widely used in manufacturing processes. A frequency distribution was made of the statistics reported for each center on each item measured in the control system. Wherever these statistics reflected an approximately normal curve (**Figure 3**), we used a statistical "confidence limits" approach to establish ranges of performance. A range of plus and minus *one standard deviation* from the mean was selected as *normal* performance, primarily because 68% of the readings fell into this area. A reading above or below this range was identified as above or below normal performance, depending on the direction of improvement.

The degree of deviation was also used as the basis for evaluating and scoring performance (**Figure 4**). Since a greater number of experiences could be expected to fall approximate to the mean, a value of 60% was assigned to the area covering plus or minus one-half standard deviation from the mean. For each one-half standard deviation ascending or descending from this 60% range, a value of 10% was assigned.

Figure 5 contains a table showing the application of the quality control technique to statistics covering Aircraft Maintenance in this Command.

The table is divided into three ranges of performance: normal, above, and below. This division appears on the left side of the chart. The caret indicates the arithmetic mean. The actual performance for the period reported appears at the bottom of the table immediately under the identification of the Center. The location of the points of the arrows in the table indicates the current status of the activity. The direction of the arrow shows the trend from the last reporting period. Scoring values appear on the right side of the table. This permits conversion of the rate to a score. Note the different rates in the table which receive the same score of 80% in the system. The vertical column of figures shows each center's range of performance.

The use of past rates of activity at each center to establish individual ranges of performance for rating purposes should eliminate most of the inequities which result from rating a center's experience against a common Command objective. As a precaution to insure the maximum amount of reliability in our interpretations of the statistics, a policy was established to recompute the standard deviation every six months.

In all items the desired range of

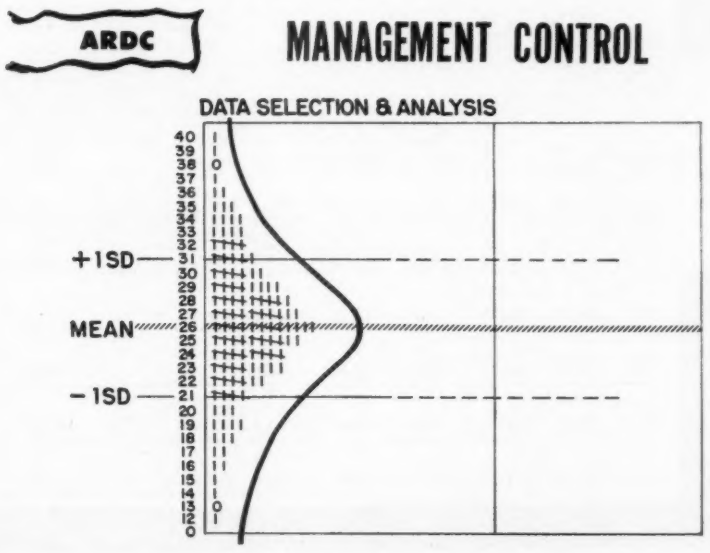


FIGURE 3 IMPROVING THE RELIABILITY OF ESTABLISHING RANGE OF PERFORMANCE THROUGH STATISTICS

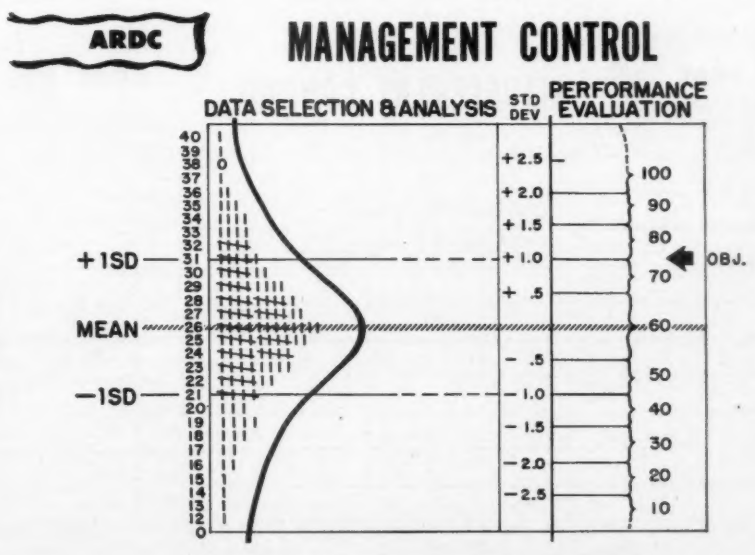


FIGURE 4 DIVIDING THE DEGREES OF DEVIATION TO SCORE PERFORMANCE

AIRCRAFT MAINTENANCE

– POINTS POSSIBLE 200

There was a daily average of 1 aircraft out of commission during this period.

THE POINT INDICATES APRIL SCORE, THE DIRECTION INDICATES TREND FROM LAST PERIOD.

AVERAGE CENTER PERFORMANCE

How well are we keeping ARDC aircraft in the air ?

	COMD	6590TH	AEDC	AFAC	AFCRC	AFFTC	AFMTC	AFPTRC	AFSWC	HADC	RADC	WADC	AFOSR	ASTIA	
ABOVE	24.5	15.50	0.0	11.60	9.50	16.4	15.80	–	16.80	24.3	–	0.0	–	–	100
	26.1	19.65	3.15	16.15	14.95	20.4	19.65	–	19.85	27.0	–	7.45	–	–	90
	27.7	23.80	7.60	20.70	20.40	24.4	23.50	–	22.90	29.7	–	18.60	–	–	80
NORMAL	29.3	27.95	12.05	25.25	25.85	28.4	27.35	–	25.95	32.4	–	29.75	–	–	70
	30.9	32.10	16.50	29.80	31.30	32.4	31.20	–	29.90	35.1	–	40.90	–	–	60
	32.5	36.25	20.95	34.35	36.75	36.4	35.05	–	32.05	37.8	–	52.05	–	–	50
	34.1	40.40	25.40	38.90	42.20	40.4	38.90	–	35.10	40.5	–	63.20	–	–	40
BELOW	35.7	44.45	29.85	43.45	47.65	44.4	42.75	–	38.15	43.2	–	74.35	–	–	30
	37.3	48.70	34.30	48.00	53.10	48.4	46.60	–	41.20	45.9	–	85.50	–	–	20
	38.9	52.85	38.75	52.55	58.55	52.4	50.45	–	44.25	48.6	–	96.65	–	–	10
	40.5	57.70	43.20	57.10	64.00	56.4	54.30	–	47.30	51.3	–	99.99	–	–	0
ACTUAL–	29.2	21.97	3.94	25.46	40.96	38.0	20.10	NR	28.94	28.5	NR	18.38	18.38	NR	

FIGURE 5 APPLICATION OF QUALITY CONTROL TECHNIQUES

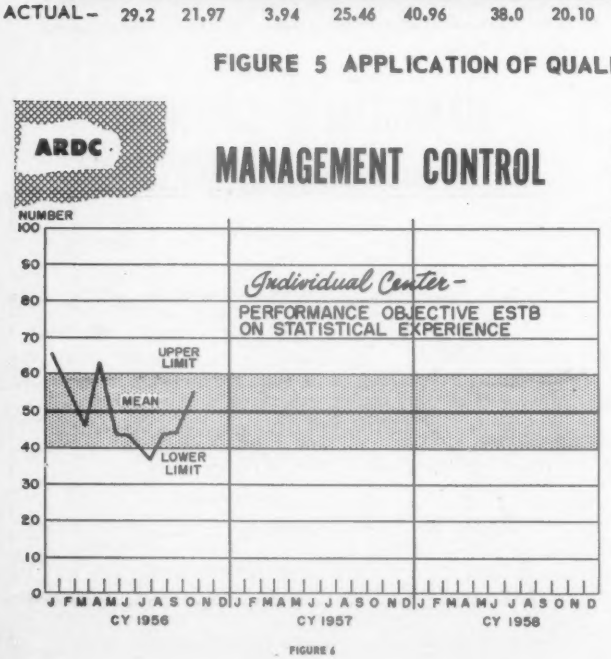


FIGURE 6

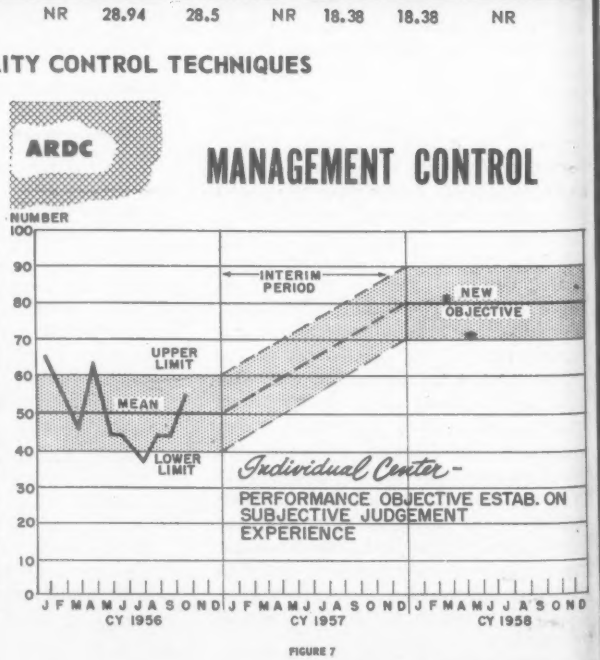


FIGURE 7

performance is above plus 1 standard deviation from the arithmetic mean. The area between plus one and one and one-half standard deviations is identified as the command objective. A reading on this range receives a value of 80% in the ARDC Management Control System. This is illustrated graphically in **Figure 5.** This command objective is emphasized to encourage improvement in performance. Setting the objective in the range of above-average performance also serves as a corrective influence on those items whose current "normal" range is suspected to be sub-normal.

For top management it is necessary only to locate the arrows in the table to determine whether current performance is above normal, normal, or below normal and to determine if any trend is present.

For ready reference to users of the system the number of points assigned to each item appears in the upper right corner of each chart (Figure 5). To determine a score for any Center, the appropriate arrow is located in the table and the percent score appearing at the right is read. This percentage is then applied to the points possible.

The evaluation of a center's total performance in the rating system results from a division of the sum of points earned in all areas by the sum of the points possible. Using "points possible" is necessary because not all items in the system are applicable to each center; consequently, it is not possible for all Centers to score the same number of points.

Basic Premise

A basic premise applied to the operation of the ARDC Management Control System is that the analysis of statistics represents only one of the factors required to produce sound management decisions. The experience and judgment of responsible officials were known to be equally important. To insure that this know-how was incorporated into the ARDC Rating System, the statistics in every rated area were presented for approval to the staff agency of primary responsibility prior to their use in the Management Control System. These three courses of action were suggested to them:

1. accept the performance ranges as established by the statistical control method (Figure 6)
2. establish a range of performance based upon subjective judgment (Figure 7)
3. establish a range of performance to conform to directives from higher headquarters (Figure 8)

The determination of how each item was to be evaluated in the system remained the prerogative of the official who was responsible for the area. However, he was advised that unless he could markedly influence the environment, two-thirds of the future performance in his items would probably fall within the normal range established by the quality control method. Therefore, if he desired a higher range of performance than the experience indicated and wished to employ course two or three, he would have to allocate additional resources or give more attention to the management of the item.

Although the Management Control System is fundamentally a technique for isolating management activities which require attention, it is competitive in its application to ARDC Centers. An ARDC Management Incentive Award Program is based upon the computation of points earned and held from month to month in the Management Control System. To reward and encourage effort for the effective use of command resources, two organizations of the twelve in this command are selected to receive quarterly and annual ARDC Management Incentive Awards for either sustained performance or outstanding improvement in the management areas measured in the system. Pennants and trophies signifying high sustained performance or outstanding improvement are presented at Commanders' and Vice Commanders' Conferences.

It is important to emphasize that the majority of items measured in the ARDC Management Control System are in the resource or support portion of our mission. Until the technical portions of the Research and Development effort are fully covered, the system will not truly or completely reflect the manner in which the total mission of the command is being accomplished. At this writing considerable work is under way to develop qualitative measurements of the technical area of the ARDC mission for inclusion in the Management Control System.

The value of any rating system, regardless of techniques of evaluation, can be measured only by its results. While progress in any area stems from the concerted action of all organizations of ARDC, the following

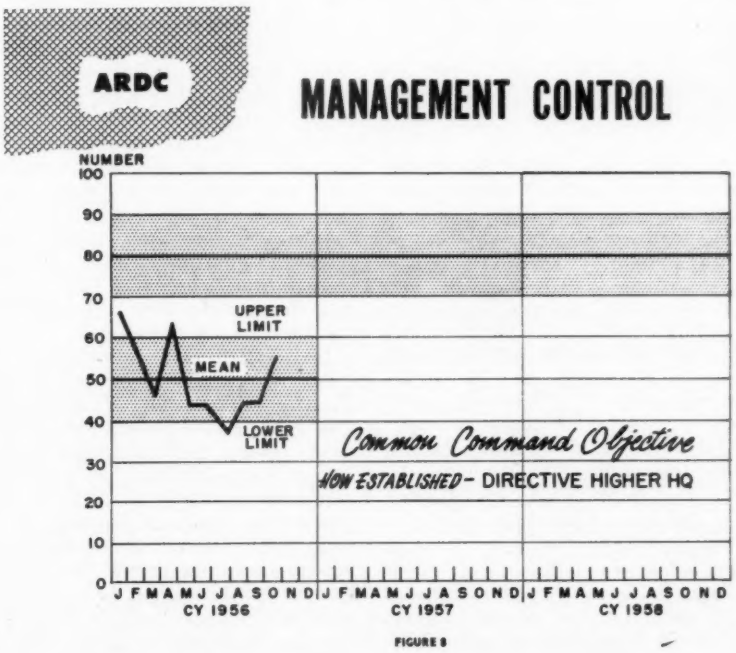


FIGURE 8

are examples of improvements which have occurred since the Management Control System was started in ARDC.

Comparing fiscal year 1955 with fiscal year 1957 performance there has been an average increase of 14% in the effectiveness of items controlled through this command management system.

An increase in the movement of supplies from a reparable status has made an additional $2,800,000.00 in supplies available for reissue, salvage, or elimination from the ARDC inventory.

Two hundred additional airmen have been added to the skilled manpower potential of ARDC by increasing the number of airmen in on-the-job-training programs.

Flight Enterprises Story

(Continued from page 32)

work requirements detailed. But for the "Cycle" or "MATS/SAM" program a pattern of requirements was clearly outlined. The work specifications of the cyclic or periodic phases of aircraft maintenance could be defined so that the using activities would be assured of the return of their aircraft in A-1 condition and in time.

Scheduling of aircraft in and out of hangars was followed on a timetable as strict as an airline flying schedule. Tremendous savings in costs were passed on to the Government as a result of eliminating unnecessary functions and operations. Certain operations safely deferred during one phase of the maintenance work were accomplished at the next. Unnecessary "opening" of certain areas of the aircraft were avoided *and, more important,* essential areas were never overlooked.

Punched cards detailing all the various steps outlined above were programmed through the equipment and summarized for evaluation of results. It soon became apparent that items "A," "B," "F," "K," "P," and "Z," had to be performed on every aircraft. Items "C," "E," "M," and "X," on every other aircraft, etc. Items "A," "E," "R," and "S" would require overhaul after each 1,000 hours of usage, while items "G," "H," "N," and "T" could safely be deferred for an extra 1,000 hours of use.

Now we knew how many men of each skilled category were required to do certain items of work. We had visual records to compare hours (with the relative costs) for the same item of work performed on many aircraft. And, most important, we gave management a day-by-day, blow-by-blow description of the progress of the work. Problem areas, when they appeared, were spotted in time for quick action.

Costs and hours were controlled by balancing with timecards and payroll records. Distribution of these labor costs and hours to the various work orders was now automatic and speedy. In a short time, material control and costs were transferred from manual methods to our tabulating equipment. After that, the preparation of the payrolls, payroll records, etc., was next.

The strain of all these functions and operations points to the need for equipment built to handle the volume. The Univac 60, now being installed, will enable us to give more and faster service.

CHALLENGE THE BEST

by John Randolph Hook, Capt Arty
Department of Electrical Engineering
United States Military Academy

Civilian industry today is making a powerful bid for the cream of America's manpower. Here is a possible solution to the Army's problem of competing for its fair share of this manpower.

TODAY, as never before in history, professional competence and a variety of talents must be the trademark of the career soldier. This is not simply the personal feeling of military men but the necessary conclusion of any impartial observer viewing the magnitude and diversity of tasks facing the armed forces.

At the present time it is difficult to find a country where our men in uniform do not represent us. However, their job requires somewhat more than being good-will ambassadors of the United States. They must be technicians, tacticians, and teachers: technicians, capable of understanding the complex weapon systems of modern war; tacticians, able to integrate these new weapons into our present defensive and offensive doctrines; and teachers, competent to impart our concepts to others to insure that we will continue to have allies well versed in the latest tactics and weapons.

In addition to these abilities, the career officer and senior noncommissioned officer must be a leader of men. The army leader must feed, clothe, teach, counsel, and discipline, as well as provide entertainment for large groups of men. Probably no other professional group is responsible for so many of the needs and wants of such heterogeneous groups of their fellow men. It has been said that the Army contains the largest body of practicing, practical psychologists in the country. This may be a slight overstatement but there is no denying that the leader of soldiers must know a great deal about his fellow men because he lives in such intimate contact with them.

From the preceding discussion it is apparent that the Army needs its fair share of the Nation's leaders and potential leaders in nearly every field. Civilian industry, however, is making a highly competitive drive to obtain the cream of the country's manpower. To accomplish their aim the leaders of industry are making salary offers to desirable men far above the offers that were being made a few years ago.

Our problem is this: How can we attract and hold the best qualified personnel in this period of prosperity?

In an attempt to find a solution to this problem our military leaders have diligently advocated the adoption of many career incentive programs. These programs in themselves are fine and there is no doubting the fact that service families deserve the benefits derived from them.

However, we are not going to attract the Nation's most promising young men by trying to compete with civilian industry on its own terms. If we place our career attractiveness on a monetary basis then we deserve to be beaten by any organization that can top our price.

One point is certain: We must recruit to accomplish our mission. But in recruiting let's take a different approach. Let's appeal to those spiritual qualities that we know exist in abundance in our young men. Let's make our appeal along these lines:

We need you. We need the best of you to give the best that you can give. Your country today has the difficult task of safeguarding all of the Free World. People from all Free Nations are looking to us for protection, guidance, and material help. The bulk of the workload for this gigantic task falls to the uniformed services. For that reason we are asking for your help. We are not asking you to enlist for a short tour of duty. This is the required responsibility of every able citizen. Rather, we are asking the best of you to join our ranks permanently as career soldiers.

Send our best qualified officers and men to carry our message to the Nation's secondary schools and colleges. Offer our youth more than a chance to make a living, offer them a reason. Show them that they can have a share in building a better world by building a stronger America. Challenge them, and dare them to accept our challenge.

The legislators are slow to act in our behalf. Maybe they *will* act. Perhaps they *will not* act or will act *too late*. But the job is here *now*. We in the service see it and know that it must be done, either by men receiving high pay or by men receiving less. We cannot wait on the legislation for high pay and fringe benefits to solve our problem. We must solve it ourselves, *here* and *now*, and with the resources that we already possess within our present organizational structure.

Professional Services

This is an exclusive feature to aid the services in obtaining highly skilled personnel, GS-9 rating and above. Vacancies shown are official releases from the office concerned. Apply direct to the installation where the vacancy exists. For information about other jobs visit or write the nearest military installation.

VACANCY LIST

White Sands Proving Ground
New Mexico
- Supervisory Electronic Engineer GS-12
- Electrical Engineer GS-9
- Supervisory Ordnance Engineer GS-13
- Electronic Specialist GS-9
- Electronic Specialist GS-11
- Auditor GS-9
- Sewage Disposal Plant Operator WB-13
- Electronic Engineer GS-11

Industrial Manager
USN, Ninth Naval District
and
Supervisor of Shipbuilding, USN,
& Naval Inspector of Ordnance
Building 3400, Great Lakes, Illinois
- Supervisory Ordnance Engineer GS-13
- Supervisory Ordnance Engineer GS-12
- Electronics Engineer GS-12
- Electronics Engineer GS-11
- Electronics Engineer GS-9

David Taylor Model Basin
Washington 7, D. C.

Aeronautical Research Development and Design Engineer	$6250 to $10,065
Electrical Engineer	$6250 to $7465
Electronic Engineer	$6250 to $7465
Electronic Scientist	$6250 to $7465
Mathematician	$6250 to $10,065
Materials Engineer	$6250
Mechanical Engineer	$6250 to $7465
Naval Architect	$6250 to $8645
Physicist	$6250 to $8645
Structural Research Engineer	$6250 to $7465

U.S. Army Electronic Proving Ground
Fort Huachuca, Arizona
- Supervisory Electronic Engineer (General) GS-14
- Supervisory Electronic Engineer GS-12
- Electronic Engineer (Radio, Instrumentation) GS-13
- Electronic Engineer (General, Radio, Wire Communication) GS-12
- Electronic Engineer (Radio, Wire Communication) GS-11
- Engineer (General) GS-12
- Supervisory Electronic Scientist (General) GS-12
- Mathematician GS-13
- Mathematician GS-11
- Military Intelligence Research Specialist GS-9
- Military Intelligence Analyst GS-9
- Publications Editor (Physical Sciences & Engineering) GS-9
- Illustrator (General) GS-9

Industrial Relations Department
U.S. Naval Torpedo Station
Keyport, Washington
- Supervisory Mathematical Statistician GS-12
- Supervisory Ordnance Engineer GS-12
- Ordnance Engineer GS-11
- Physical Metallurgist GS-11
- Mechanical Engineer GS-11
- Electronic Engineer GS-11
- Mathematical Statistician GS-11
- Ordnance Engineer GS-9
- Chemist (Analytical) GS-9
- Electrical Engineer GS-9
- Mechanical Engineer GS-9
- Electronic Engineer GS-9
- Physicist (Sound) GS-9
- Mathematical Statistician GS-9

Industrial Relations Officer
U.S. Naval Avionics Facility
Indianapolis 18, Indiana
- Fire Control Design Engineer GS-9
- Fire Control Design Engineer GS-11
- Electronic Engineer GS-9
- Electronic Engineer GS-11
- Mechanical Engineer GS-9
- Mechanical Engineer GS-11
- Electrical Engineer GS-9
- Electrical Engineer GS-11
- Electronic Scientist GS-9
- Electronic Scientist GS-11
- Physicist GS-9
- Physicist GS-11

2nd Coast Guard District
St. Louis, Missouri
- Electronics Engineer (Radio) GS-9

3rd Coast Guard District
New York, New York
- Civil Engineer GS-11

5th Coast Guard District
Norfolk, Virginia
- Electrical Engineer GS-11
- Electronics Engineer (Radio) GS-9

7th Coast Guard District
Miami, Florida
- Electrical Engineer GS-11

9th Coast Guard District
Cleveland, Ohio
- Civil Engineer GS-9

11th Coast Guard District
Long Beach, California
- Electronics Engineer (Radio) GS-11
- Civil Engineer GS-11

12th Coast Guard District
San Francisco, California
- Civil Engineer GS-11

14th Coast Guard District
Honolulu, T. H.
- Civil Engineer GS-9

Washington Radio Station
Alexandria, Virginia
- Electronics Engineer (Radio) GS-9
- Maintenance Engineer GS-9

U.S. Coast Guard Headquarters
Washington, D.C.
- Supervising Naval Architect GS-13
- Supervisory Naval Architect GS-12
- Naval Architect GS-12
- Electrical Engineer GS-12
- Aircraft Design Engineer GS-12
- Electrical Engineer GS-11
- Structural Engineer GS-9

Navy Overseas Employment Office
(Pacific), Section A
45 Hyde Street
San Francisco 2, California
- Engineers
- *Architectural, Hawaii, GS-11
- Civil, Philippines, GS-12
- Electronics, Guam, GS-13
- Electronics, Guam, GS-11
- *Fire Prevention, Hawaii, GS-12
- Industrial, Guam, GS-11
- Miscellaneous
- Physical Science Aid, Guam, GS-5
- Journeymen
- Electronics Mechanic, Hawaii
- *Applicants must have Civil Service status

Industrial Relations Officer
Industrial Relations Department
Naval Air Station
Corpus Christi, Texas
- Supervisory Technologist (Rubber & Plastics), GS-12
- Mechanical Engineer GS-11
- Materials Engineer GS-11
- Physical Metallurgist GS-11
- Physical Metallurgist GS-9
- Electrical Engineer GS-9
- Supervisory Property Disposal Officer GS-9

Rome Air Force Depot
U.S. Air Force
Griffiss Air Force Base, New York
- Mathematician GS-11
- Freight Traffic Officer GS-9

Dates to Circle

February 4-6

Fourth Annual National Radar Symposium—University of Michigan Engineering Research Institute, Ann Arbor: sponsored by the U.S. Army, Navy, and Air Force.

February 26-28

Third Annual Jet Age Conference —Sheraton-Park Hotel, Washington, D. C.: sponsored by the Air Force Association.

How Quality Improvement Works At Watertown Arsenal

by Bernard Polonsky

A natural source of dollar savings and management improvement can be tapped if pertinent facts are reported quickly to top levels of authority. The strategy is to link communications with the top . . .

WATERTOWN Arsenal is an industrially funded installation. The purpose of industrial funding is to provide "a more effective means of controlling the cost of goods and services produced by industrial and commercial type establishments, and a more effective and flexible means of financing, budgeting, and accounting for such operations." Working capital is reimbursed from regular appropriation budgets, such as production orders, when and if goods are delivered. Like any industrial firm, such an installation will eventually go broke if no provisions are made to recover the cost of each basic order. But how is cost controlled?

At Watertown, a cost accounting system is in operation for recording a complete cost breakdown of work performed. An accurate reporting of scrap and spoilage is a necessary part of cost study and cost reduction. Manufacturing loss is generated by substandard workmanship, faulty equipment and processing methods, and crash design and development, or various combinations of these. These causes are a damaging deterrent to "homing into" the estimated target price of an order.

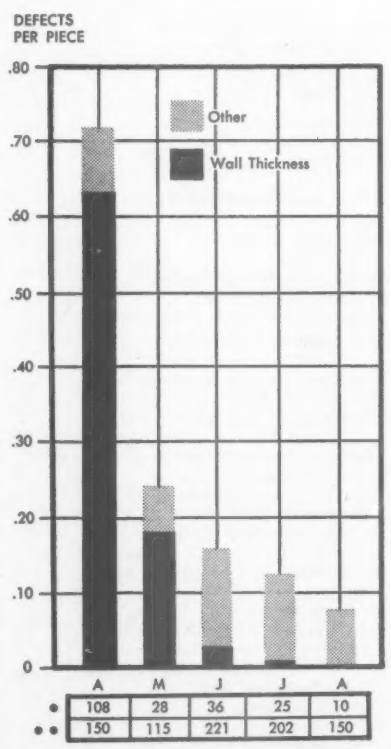
To reduce the cost of failure, repairs, replacement, and inspection, a plan is needed which will strike the optimum balance between the value of quality and the cost of quality.

A quality engineering group has been set up at Watertown Arsenal, charged with improving existing product quality in fabrication. Men were selected who had shop experience. Most important was their acceptance into shop society. They acted as staff assistants to the companion Factory Branch, within the Arsenal Operations Division. Control was exercised by building quality into manufacturing, and by regulating the system with detailed procedures. The course of action to be taken for review and disposition of discrepant material was charted. An improved reporting system to assist in diagnosing causes of defective products was set up.

In its first "case," Prato's law guided the decision of the Quality Committee to install a pilot study in a machine shop operation with the highest loss ratio.

The first step was to gather information on the cost and the nature of the defects on a timely basis. Reporting was done by Job Performance Report (JPR) and Rejection Report (RR), specifically tailored for the quality engineer's review. A JPR was devised for the machine operator and foreman to communicate faults to the equipment engineers, preventive maintenance men, methods and time standards writers, tool designers, gauge checkers and project engineers.

The RR described, by the inspector, nonconformance to drawings and specifications, and included quantities rejected together with pieces inspected. For the first time, costs could be directly associted with a generated defect. The statistics available from the results of inspection were "percent defective," based on piece and dollar value, and a tally of "defects by frequency" of occurrence for each project and part.



* No Defect Obs.
** No Pieces Inspected.

The data was then arrayed for detecting sporadic and chronic defects. Sporadic defects were the day-to-day brush fires which could be extinguished without delay, easily attracted to everyone's attention, and chronic defects the repetitive unkown disease which would ultimately lead to financial destruction, if not stopped in time.

The chronic defects required more extensive investigation and analysis and needed the direction and supervision of the project (quality) engineer. (The project engineer concept was simply a deeper decentralization of organization management in a large business. The combination of delegating program responsibility and accountability to the specialist spurs him into searching for cost reductions.)

A chronic production enigma under the new system was tackled by the writer, using a very basic scientific approach, to either alter the average quality of the process or to reduce the variability.

To solve the problem, the author tabulated each instance of nonconformity to specification (defect) on selected parts (units), observed at 100% final inspection. Components were picked on the basis of losses over $50, and percentage defective of 10%, or more. The accompanying graph records a prize problem area—a 91.5% defective part in March 1956, based upon the number and type of defects per piece. One single defect (wall thickness) accounted for 63% of the total and was reduced to zero in five months.

At the outset, emphasis was on teamwork, on quality at the expense of quantity, and on the rewards from technically trained assistance. Formal acceptance of these terms was not required. Under the right conditions they would become part of the shop's daily habit. Extra dividends could be guaranteed by projecting the value of operator responsibility and craftsman-

ship. Conservative elements opposed any change in the old order with remarkable vitality and perserverance. The natural antagonism to change had to be overcome by sincerity and objectivity. To change from familiar, established patterns of routine, suspicion and doubt must be erased from the minds of the affected personnel. This basic inertia was overcome by placing the experiment within a controlled area, selected on the basis of progressive personnel.

The scientifically planned "case" investigation penetrated all the various streams in the manufacturing processes, from procurement of raw material, through fabrication, rough machining, welding, and to finish machining. Data from each tributary stream of operation had to be evaluated for its major contribution to wall thickness variability. Testing by the analysis-of-variance method isolated the responsible operation at the final machining stage. The within-piece component of variability was significantly greater than the piece-to-piece variability. A microscopic examination of every final machine operation revealed that a biased attempt was made to compensate for faulty templates on the copy lathe. After the templates were replaced by a new pair, the set-up man was "on the target" for a production run on all three shifts.

An inherent factor was also reduced, when the sequence of operations was revised to finish the inside surface after welding and just prior to cutting the outside contour. Scrupulous attention to the feedback of results to the immediate supervisor of the operating section brought prompt corrective action. Within three months, the capability of the process was within limits, at the same time satisfying the customer's requirements at a savings.

As additional supervisors in the shop became genuinely quality minded, defects generated by the workers were steadily diminished. The prevention habit had taken root. Weekly recapitulation of performance was posted on the bulletin boards. Pyramid reporting was transmitted to all levels of management. The results of the "case" study educed recommendations for corrections to be made by management. Each of the listed changes represented a major contribution toward eventual process control:

a) **sampling receiving inspection of incoming material,**
b) **notification to supplier of defective stock,**
c) **identification of each component with serial number and lot number prior to first machine operation,**
d) **association of each characteristic generated with the worker, and**
e) **patrol (process) inspectors at the machines.**

During the first eight months of operation, a steady improvement in the conformance to specifications and drawings resulted in a decrease of approximately 45% in the rejection rates of some component parts. The corresponding reduction in manufacturing losses has been estimated at $2,000 per week in the trial area. Intangible benefits were several: staff assistance to the foreman gave him full scope for his primary duties; inspection became an assurance "member of the team"; specification changes initiated and adopted were increased; and defect-prevention efforts were concentrated in one group. Favorable arsenal-wide chain reaction occurred when the rejection rate for the last three trial months was reduced 31.5% lower than the first three months, whereas the reduction was 35.0% in the test building. Frequent expressions of support by the commanding officer helped. Upon the success of the pilot installation, the Quality Improvement Committe received the C.O.'s approval for the launching of a broad program embracing other manufacturing segments. The Arsenal reduced the rework and scrap rate 37% during the first year of operation, FY1956, from FY1955 and made a further reduction of 46% in FY1957.

In the complete evolution from the control of the product to the control of the process, causes of defects resulting from poor supervision, limited machine capabilities, inadequate supplies, and faulty designs must be eliminated. In addition, the requirements of a quality control system as specified in MIL-Q-5923C should be implemented with standard operating procedures. Economic quality acceptance can be assured by surveillance checks of the procurement and inspection systems. The promotion of patrol (process) inspection would give performance information to the shop foreman, and make possible further reductions in unit cost. The use of statistical quality control for management improvement is one other tool for sound administration, just as are work simplification, supervisory development, incentive awards, financial management, etc. Col. R. M. Hurst, the present Watertown commanding officer, summed up the situation when he noted that continual follow-up with close supervision must be the rule to insure long-term gains. If these goals are attained, a total quality control program throughout the entire cycle from design to customer satisfaction will result.

Operation Clean-up

(Continued from page 36)

SandA Manual paragraph 16154. A total of 6,000 cubic feet of procurement records were destroyed and 4,250 cubic feet transferred to NRMC Mechanicsburg and 5,472 square feet of space released.

Benefits of the overall program can be briefly summed up like this:

Phase I—Unestimated savings in better paperwork management and increased efficiency and morale of the individual employees.

Phase II—An annual saving of $14,140 on active records maintenance, untold savings in material and equipment returned to stock, alleviation of the critical space problem and forestalling the purchase of new cabinets.

Phase III—The following savings:

$ 4,500	Forms Management
29,430	Change to open shelf filing
1,968	Duplicate file discontinued
13,255	Maintenance of cabinets
$49,153	

Under the entire records retirement program a total of 11,076 cubic feet of records were destroyed with an additional 5,408 cubic feet of records transferred to NRMC Mechanicsburg. Estimated total savings amount to more than $64,000—not bad, for a few weeks work.

• General MacArthur has said that World War II was "an Engineers' War"—indicating that American military engineering was a decisive element in our superiority.

• Owens-Illinois Vineland Plant recently mailed over 100 letters to the plant's retired people, offering them a supply of blood if needed by themselves or husband or wife, and free physical examinations at any time in which mutually agreeable hours can be set. *Personnel Newsnotes.—Owens-Illinois Glass Company.*

• The overseas Army is divided into tactical forces deployed in Europe and in Korea, and military missions scattered in many other parts of the world, generally where our combat troops are not stationed.

• U.S. Naval Hospital, Jacksonville, Fla., has installed bumpers on all ward food conveyors saving conveyers, doors and screens from damage. Material and manhour savings are estimated at $1,700 a year.

Your Investment Future

1958—YEAR OF UNUSUAL OPPORTUNITY

by W. Mac Stewart

Vice-President, Research, Hamilton Management Corporation

This year, and perhaps part of 1959, should offer us investment opportunities that we haven't had for ten years! The last time we had a similar advantage was in the 1947-49 era of readjustment following World War II. Let's examine the situation that creates these opportunities, and see how we can best take advantage of them:

Long-term trends in stock market movements are not reversed suddenly. After an extended rise, prices lose their upward momentum and spend a period of time in a "top" area. A recent example is the sixteen-month period ending in July of 1957. The decline that followed was checked in October. Then for the remainder of the year the market developed a sawtooth pattern, with peaks and valleys following each other at short intervals.

During such a period, some issues may temporarily continue a downtrend, while others might be rising. Then these brief trends can be reversed; so we have many individual up-and-down patterns occurring during the longer interval.

This type of action is sometimes referred to as "building a base." During the base-building process, prices of individual stocks decline to a level at which they become attractive to long-term investors. These investors patiently accumulate shares in a price range that is attractive to them and, in time, absorb the entire supply of shares available at those prices. If demand persists, buyers will find other shareowners willing to sell at higher prices. As prices move up, demand slackens, with a resultant drop in price. When the price drops down to a more attractive level, accumulation starts again. Then prices again start an upward movement, thus building this see-saw pattern. Generally speaking, the longer the period of time involved and the larger the number of shares traded in this base period, the more solid is the base, and the better it can support a long upward movement.

It now appears that during 1958 the market may be building such a base. During this period we will probably see uptrends and downtrends, as the market tries to move before its base is firmly established. High points may be 5 to 10 percent above the 1957 market closing levels, and low points 5 to 15 percent below the '57 close. The low points of this base formation will afford excellent opportunities for sound, long-term common stock investment. Patience will be required in seeking out these lows for various issues, but will be well rewarded.

The 1960's will see higher standards of living, in which research now going on in chemistry, atomic energy, utilization of solar energy, electronics and many other fields will play a major part. This will benefit not only all the people of our Nation, but will be rewarding for the stockholders of American industry. All this progress will be accompanied by higher taxes, more social benefits, more accent on science, and more inflation.

You and I will enjoy the effects of these new developments—except inflation. Unfortunately, the bad comes along with the good. While a certain degree of inflation fosters the progress we welcome, it can work considerable hardship on individuals. The forward-looking man must take steps to protect the purchasing power of his dollars. History has proved that sound common stocks and common stock investment media are time-tested methods of providing this protection.

If you take full advantage of the investment opportunities offered in 1958 and possibly 1959, you will be in a position to enjoy the higher living standards of the 1960's, because you will have lessened the effects of the accompanying inflation.

As a special service to our readers, Mr. Stewart will personally answer your questions on investments by mail. Simply address your card or letter to Financial Editor, ARMED FORCES MANAGEMENT *magazine, 1001 Vermont Ave., N.W., Washington 5, D.C.*

● The technical problems associated with equipping missiles with the small, versatile atomic warheads being developed are infinitely simpler than those confronting the Army when it tries to squeeze these warheads through the conventional gun barrel.

New Products

Lead Items This Month

(For more information, see advertisers' index)

How to Use AFM Prepaid Reply Card

In this issue, a postage free card is provided for your convenience in requesting descriptive and informative literature. This will be forwarded to you, without obligation. Many cost saving ideas are generated by Operating Departments that have information on products available. Purchasing Officials will find this type of information invaluable. Just fill in name, address, circle number required and mail. Descriptions sent to AFM direct from the supplier.

Visual Control Board

Wassell Organization, Inc. Produ-trol not only schedules but automatically checks with time, line, and color control, has low original and up-keep cost.

For more facts request No. 1 on reply card

Boardmaster Control

Graphic Systems. This firm reports men interested in efficient management can get things done with Boardmaster Visual control which gives a graphic picture of operations, spotlighted in color, saves time, money, and stops errors.

For more fact request No. 2 on reply card

Inventory Control

Wassell Organization, Inc. Lists 16 reasons why you should be cutting costs and speeding efficiency with the simplified inventory control, Sig-na-lok. Visible control puts inventory at your fingertips.

For more facts request No. 3 on reply card

Visual Control Board

Wassell Organization, Inc. The new Vu-board, which shows all important data, sets up and operates easily, has unlimited uses for scheduling, charting, dispatching, etc., is offered at low cost by this firm.

For more facts request No. 4 on reply card

Replacement Faucet Stems

Miller Manufacturing Company. Reports leaking compression-type faucets, lost water and excessive maintenance costs are gone forever with the installation of Belco ball bearing replacement stems, complete with bibb washers.

For more facts request No. 5 on reply card

Noiseless Typewriter

Remington Rand claims its new exclusive Remington noiseless typewriter creates 85% less typing noise than competing models. The difference is the exclusive pressure printing principle that eliminates the hammer-blow action found in other typewriters.

For more facts request No. 6 on reply card

New Services

Filing Manual

Wassell Organization, Inc. A free booklet on filing is being offered by this firm, contains in charts and illustrations some answers to questions such as the space problem, how to eliminate congestion, comparison of three filing methods.

For more facts request No. 7 on reply card

Mutual Fund

Brown, Madeira & Co. For persons interested in starting a personal investment program this firm offers conservative type, middle-of-the-road type, or aggressive type investment. Firm specializes in Mutual Investment Funds.

For more facts request No. 8 on reply card

Income Fund

The Keystone Company. This leading eastern investment firm offers Series K-2, a diversified investment in securities selected for future income.

For more facts request No. 9 on reply card

Investments

Hamilton Management Corp. Through Hamilton Funds, Inc., a managed common stock investment fund, this firm offers lump sum or monthly investment plans to fit any budget. Interested persons can inquire without obligation. Firm recently declared another quarterly dividend.

For more facts request No. 10 on reply card

Supervisor Improvement

Executives' Service, Inc., provides two publications which it claims will better the everyday performance of foremen and supervisors, raise output, cut turnover, improve morale, minimize waste, slice costs and injury frequency.

For more facts request No. 11 on reply card

Other New Products

CAMERA: The Kodak Listomatic Camera that photographs tabulating cards in column listings is now being distributed and serviced by Recordak Corp. It has been renamed the Recordak Listomatic Camera. First introduced in 1955, the Listomatic has since found a number of applications.

principally a time-saver in producing parts lists, membership rosters, etc.

For more facts request No. 124 on reply card

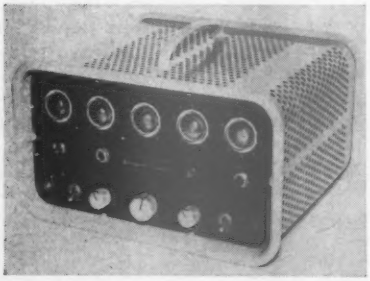
KARDEX POCKET: An improved Kardex pocket just introduced by Remington Rand features positive lay-back, stronger interlocking lugs, more resistance to wear and a new green card stock. The pocket is available now as standard equipment in the new aristocrat Kardex cabinet.

For more facts request No. 125 on reply card

FORK TRUCK: Pettibone Mulliken Corp. has introduced a new 20,000 lb. capacity fork lift truck for use over any surface, from unpaved yard areas to smooth plant floors. High flotation tires, four-wheel drive and power steering give the new Super 20 Cary-Lift ample traction and maneuverability for working on any surface conditions.

For more facts request No. 103 on reply card

ELECTRONIC COUNTER: The all-new Model WE-120, from Westport Electric, portable, light weight, five-decade frequency or events per unit of time meter and electronic counter uses decade glow transfer tubes for both digital presentation and digital division of the time base frequency. The simplified circuitry of the glow



transfer tubes provides a high degree of reliability (counter tube life expectancy in excess of 10,000 hours), and low power consumption.

For more facts request No. 113 on reply card

NEW LITERATURE: Now available are the proceedings of the 21st Annual Time and Motion Study and Management Clinic sponsored by the Industrial Management Society last fall. 105-page book includes charts, forms and illustrations, complete transcripts of talks by top leaders of labor, management and government.

For more facts request No. 104 on reply card

SPECIAL SERVICE: Operation of a special service facility has been announced by the Griscom-Russell Co., manufacturer of heat transfer units. The new facility at the Massillon, Ohio, plant will service other companies requiring a unique combination of special equipment and welding, brazing, assembling and quality control techniques for the fabrication of precision products, all under one roof.

For more facts request No. 105 on reply card

OFFICE AUTOMATION SURVEY: The National Office Management Association, an international organization of some 18,000 office executives, has just completed a study exploring the current use and future needs of automation in offices in the categories of EDP, IDP, and ADP.

For more facts request No. 106 on reply card

ROTO-TILT: Grizzly Roto-Tilt lifts, tilts, rotates all kinds of open and closed drums, barrels, fiber containers and boxes for pouring and holding for filling, bolts, nuts, washers, other parts; powders, and granular material; oils, paints, chemicals, and other liquids. Rated at 1,000 pound capacity by Pucel Enterprises, Inc.

For more facts request No. 107 on reply card

SOLDERING IRONS: Publication GED-3553, eight pages, describes and illustrates complete line of General Electric soldering irons. Features of the irons, including light weight, calorized and ironclad tips and tubular heater are explained. Case histories of savings obtained by companies using the soldering irons are also included.

For more facts request No. 108 on reply card

AUTOMOTIVE DIFFERENTIAL: A new improved type spin-resistant automotive differential which provides increased traction on snow and ice, enables a motorist to pull out of mud and sand holes, reduces skidding on curves, diminishes swerving on rough, crowned roads, and reduces tire wear due to wheel bounce was announced recently by Warner Automotive Division of Borg-Warner Corp.

For more facts request No. 109 on reply card

SWITCHES: A new concept in panel-mounted switches—combining the advantages of both toggle and pushbutton manual control—has been announced by Micro Switch division of Minneapolis-Honeywell. The switches feature snag-proof rocker-actuators designed to prevent accidental operation. These actuators are available in two key designs.

For more facts request No. 110 on reply card

NEW CIRCULAR: A fully-illustrated circular describing complete operating and maintenance features of its new Model H electric fork lift truck is now available free from Lewis-Shepard Products, Inc. The two-color, six-page presentation, designated Circular 37, points out how maneuverability has been incorporated into the Model H through exclusive rear-wheel drive and by recessing the mast between the load wheels.

For more facts request No. 111 on reply card

ELECTRONIC COMPUTATION SYSTEM: Simplicity of operation while performing many of the functions of the giant computers is offered by this new Electronic Computation System (ECS) introduced by

Clary Corp. Built into a standard desk, the completely transistorized ECS fills the void between the "electronic brains" and the mechanical calculators.

For more facts request No. 114 on reply card

PAPER DESTROYER: The Silent Glow Oil Burner Corp. offers the Confidential Paper Destroyer, which completely destroys confidential, classified material by a unique combustion process. Now in use at banks, atomic energy plants, and other security-wise companies where caution in disposing of papers and documents must be exercised to the fullest, this unit is the answer to many similar problems.

For more facts request No. 112 on reply card

DIESEL TRACTOR: Major advances in design of the Allis-Chalmers HD-21 turbo-charged diesel powered tractor are described in the two-color, 16-page catalog (MS-1243) now available from the Construction Machinery Division, Allis-Chalmers Manufacturing Co., with matched equipment and the line of accessories also pictured.

For more facts request No. 115 on reply card

MULTIVERTERS: Packard-Bell Computer Corp. has announced the D (digital to voltage) series of completely transistorized multiverters. This group of very high speed (in excess of 500,000 conversions per second) devices generate a voltage that is the product of a digital number and a fixed or varying reference voltage.

For more facts request No. 116 on reply card

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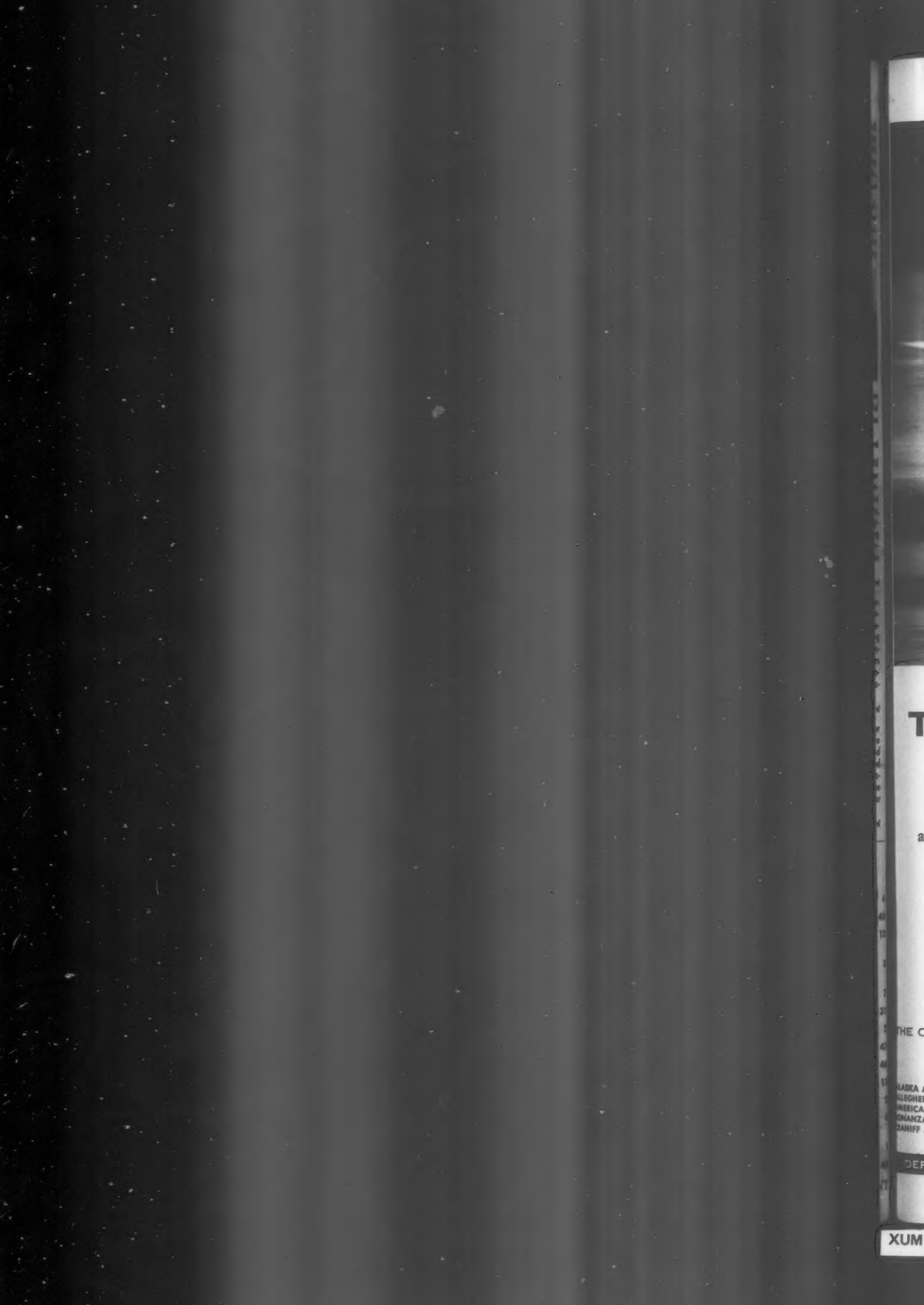

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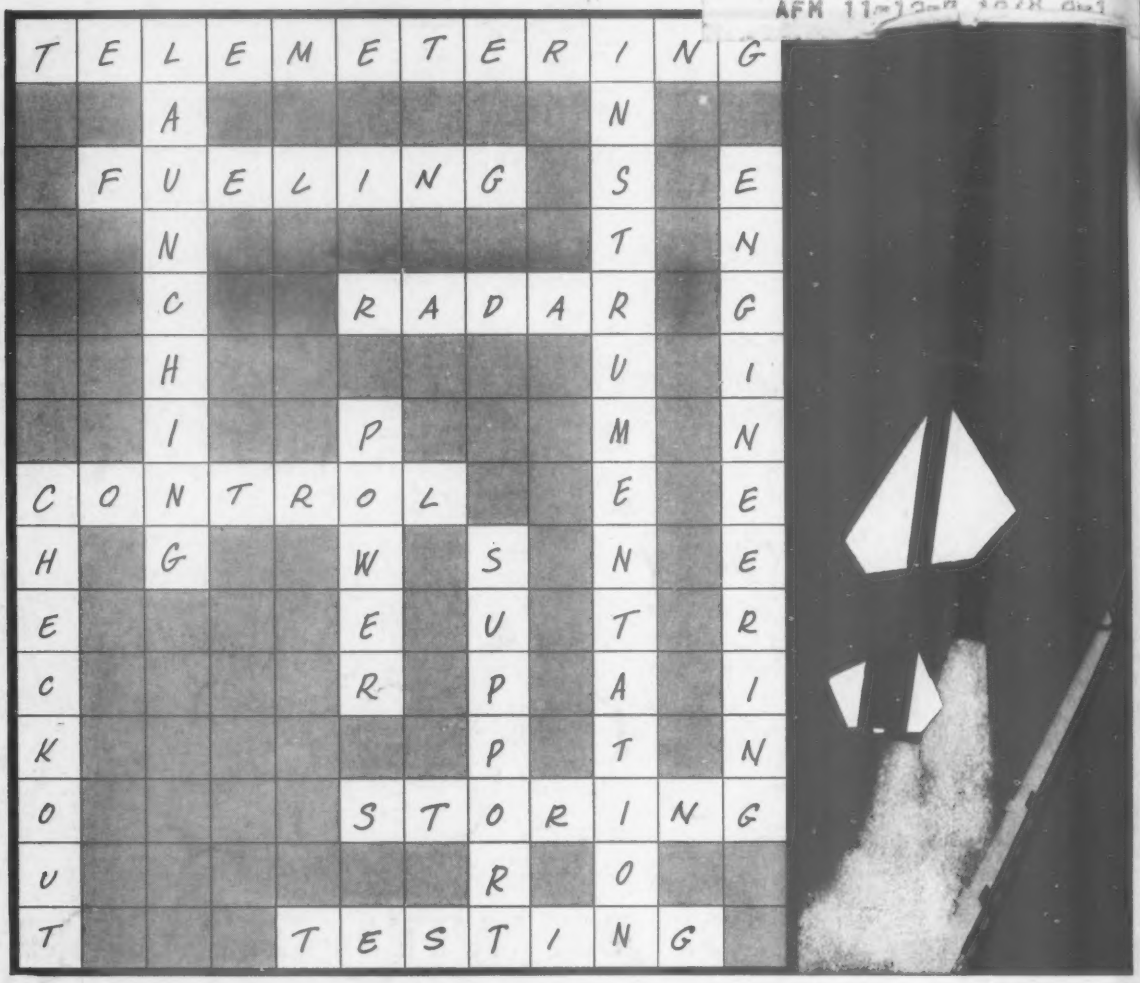

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